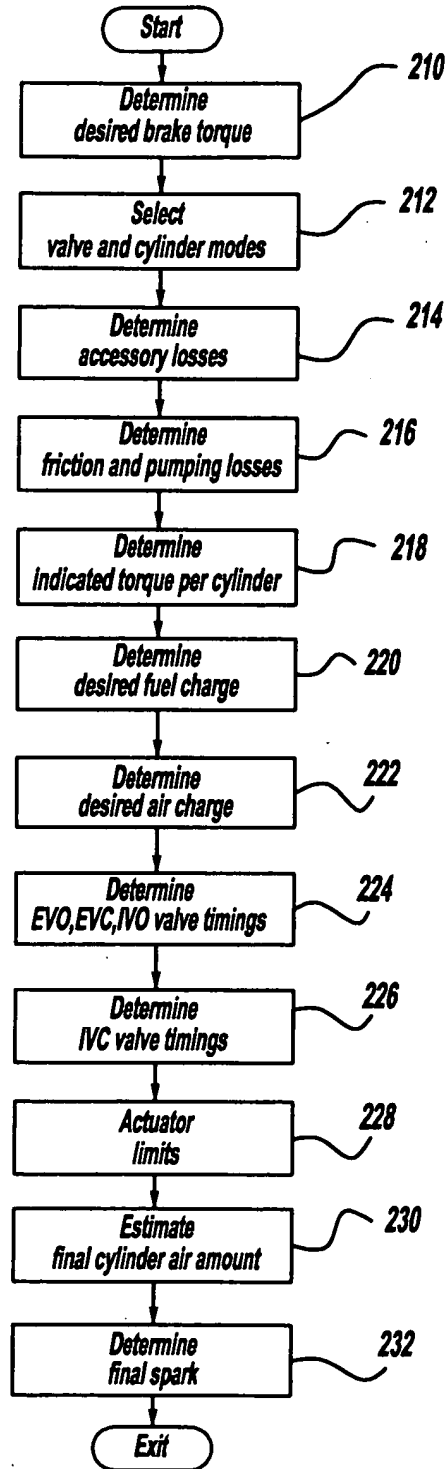
**FIG-1**

**FIG - 2**

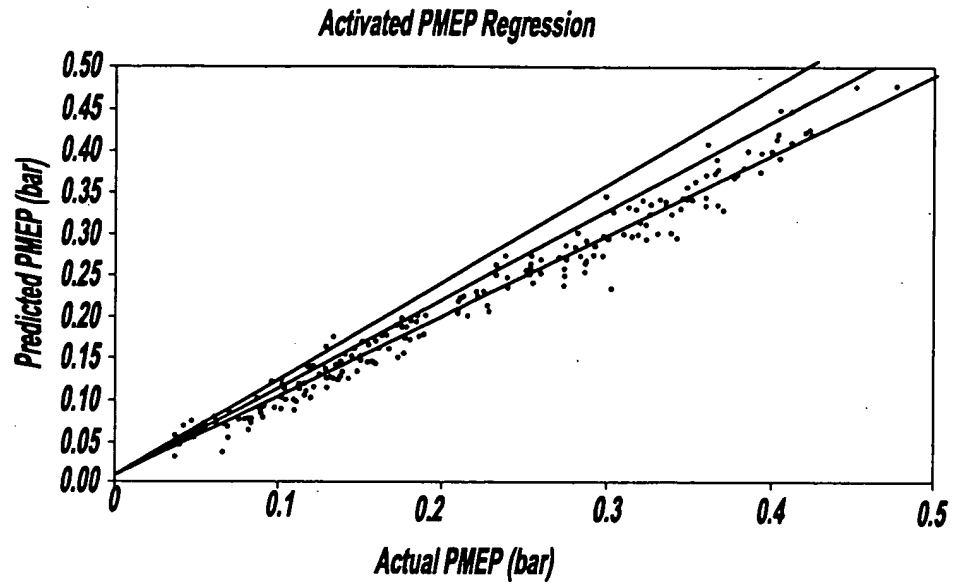


FIG - 3

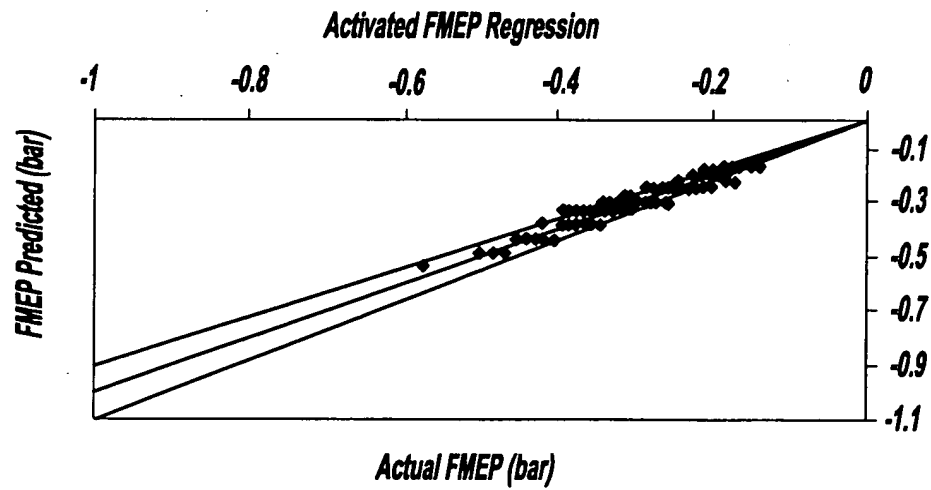


FIG - 4

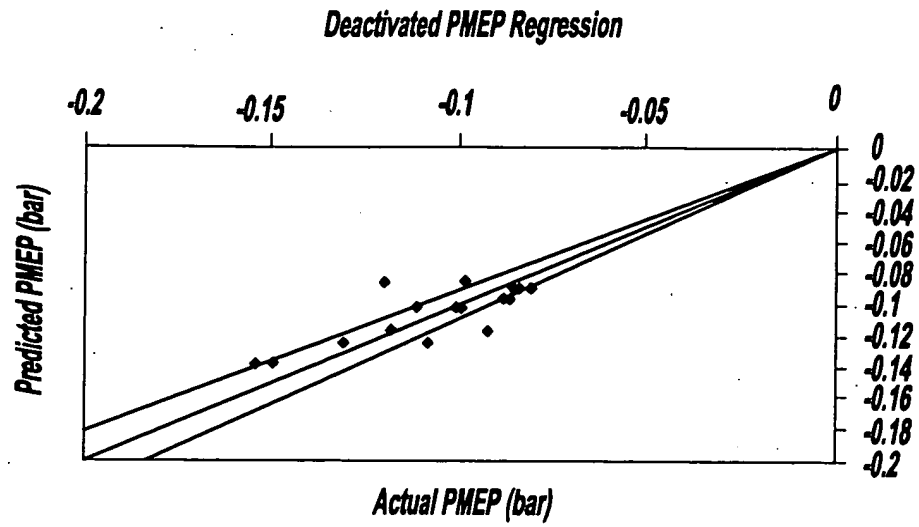


FIG - 5

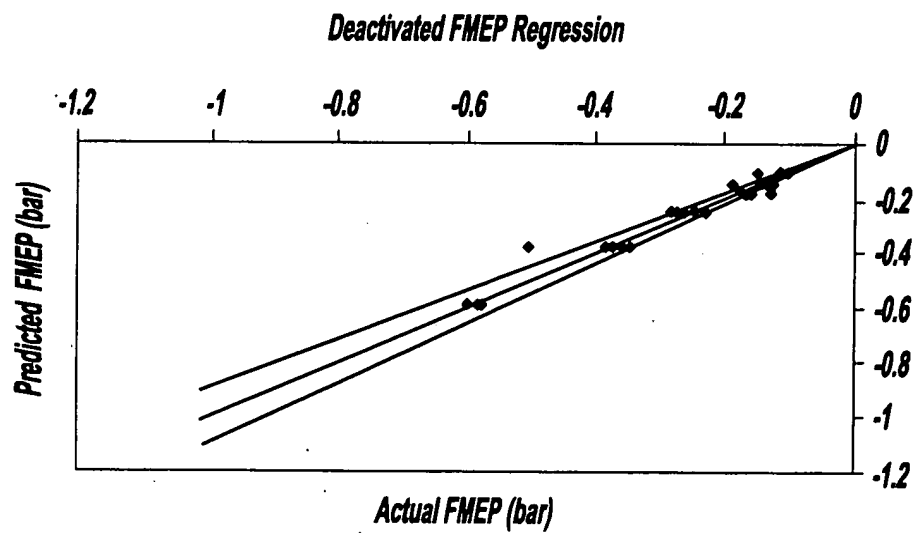
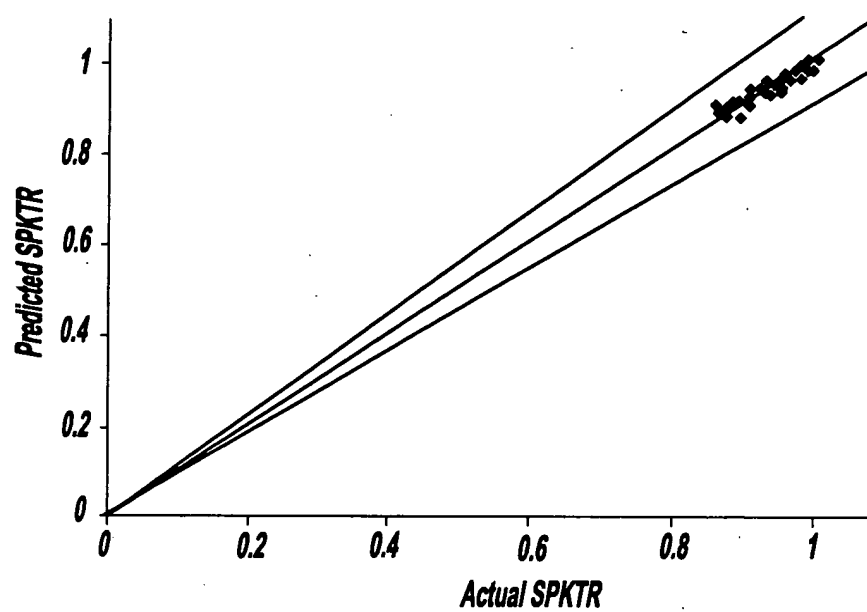
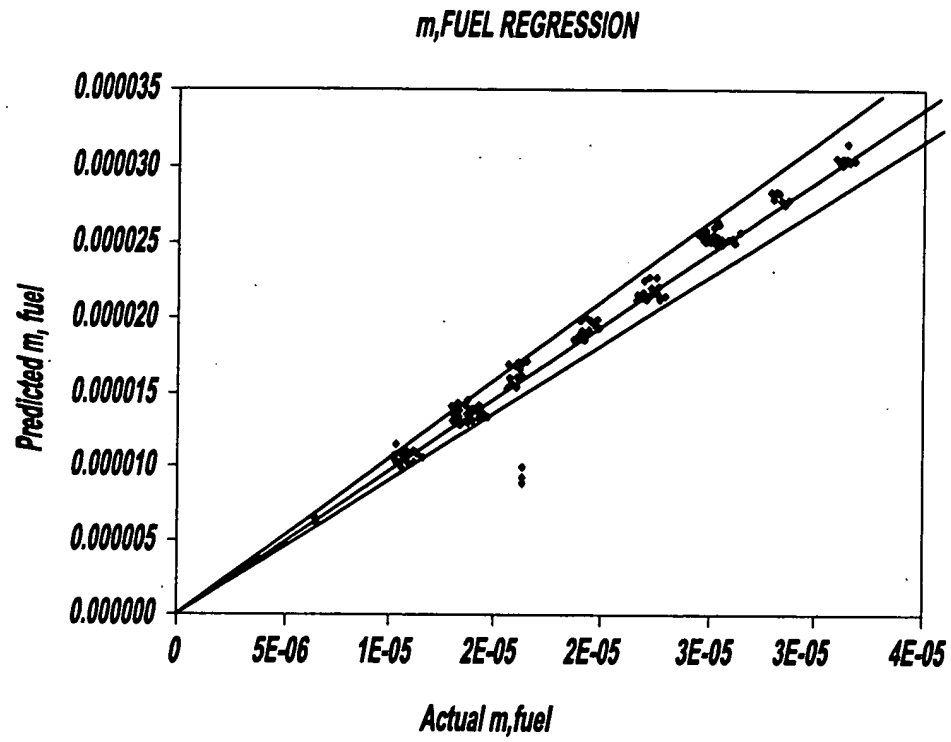


FIG - 6

Spark Retard Torque Reduction Regression**FIG - 7**

**FIG - 8**

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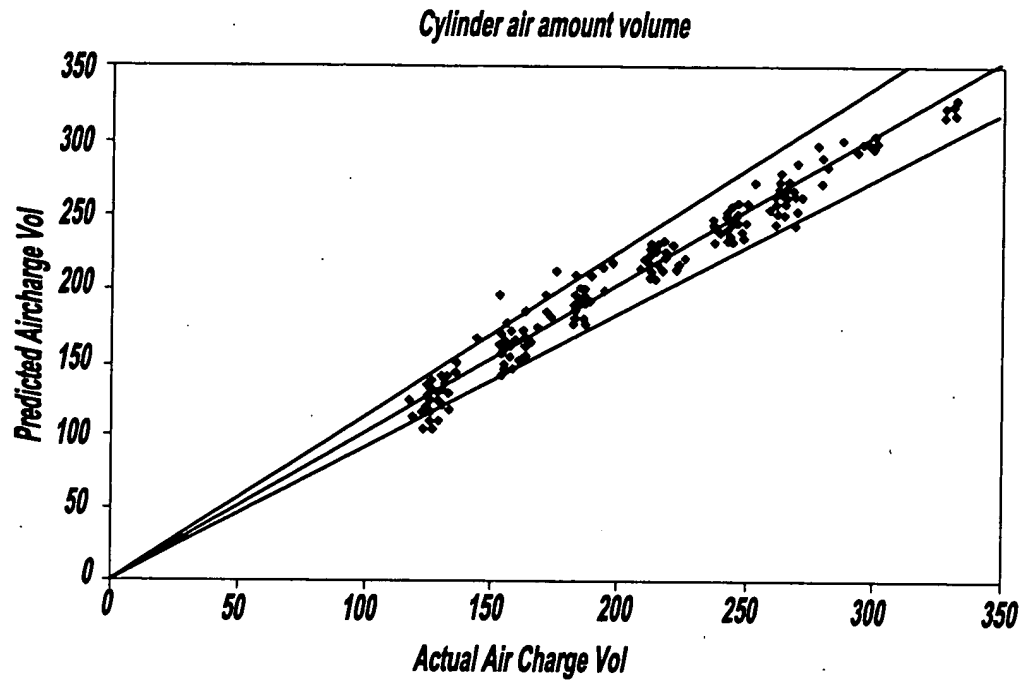
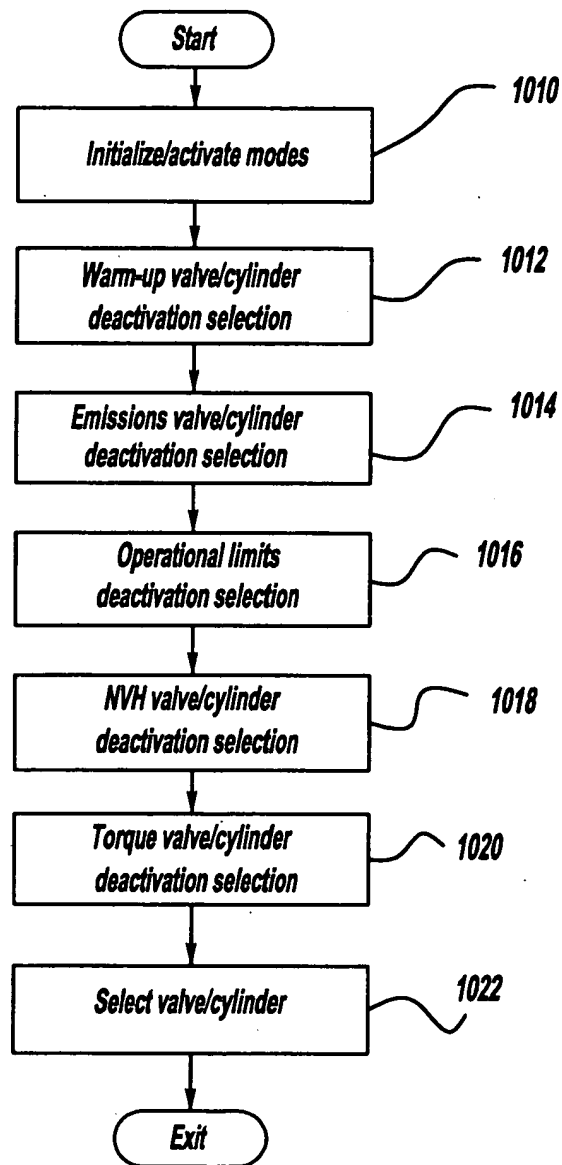


FIG - 9

**FIG - 10**

↑ DECREASING TORQUE

| | | | | | |
|-----------|--|---------------------|-------------|---------------------|-------------|
| | | COLUMN 0 | | COLUMN 3 | |
| V2 | | 1 | 1 | 1 | 1 |
| 12-STROKE | | 1 | 1 | 1 | 1 |
| V4 | | 1 | 1 | 1 | 1 |
| V8 | | 1 | 1 | 1 | 1 |
| | | DIDE | DIAE | AIDE | AIAE |

— DECREASING TORQUE →

ROW 3

ROW 0

FIG - 11

↑ DECREASING TORQUE

| | | | | | |
|-----------|--|---------------------|-------------|---------------------|-------------|
| | | COLUMN 0 | | COLUMN 3 | |
| V2 | | 0 | 0 | 0 | 0 |
| 12-STROKE | | 0 | 0 | 0 | 0 |
| V4 | | 1 | 1 | 0 | 0 |
| V8 | | 1 | 1 | 1 | 1 |
| | | DIDE | DIAE | AIDE | AIAE |

— DECREASING TORQUE →

ROW 3

ROW 0

FIG - 12

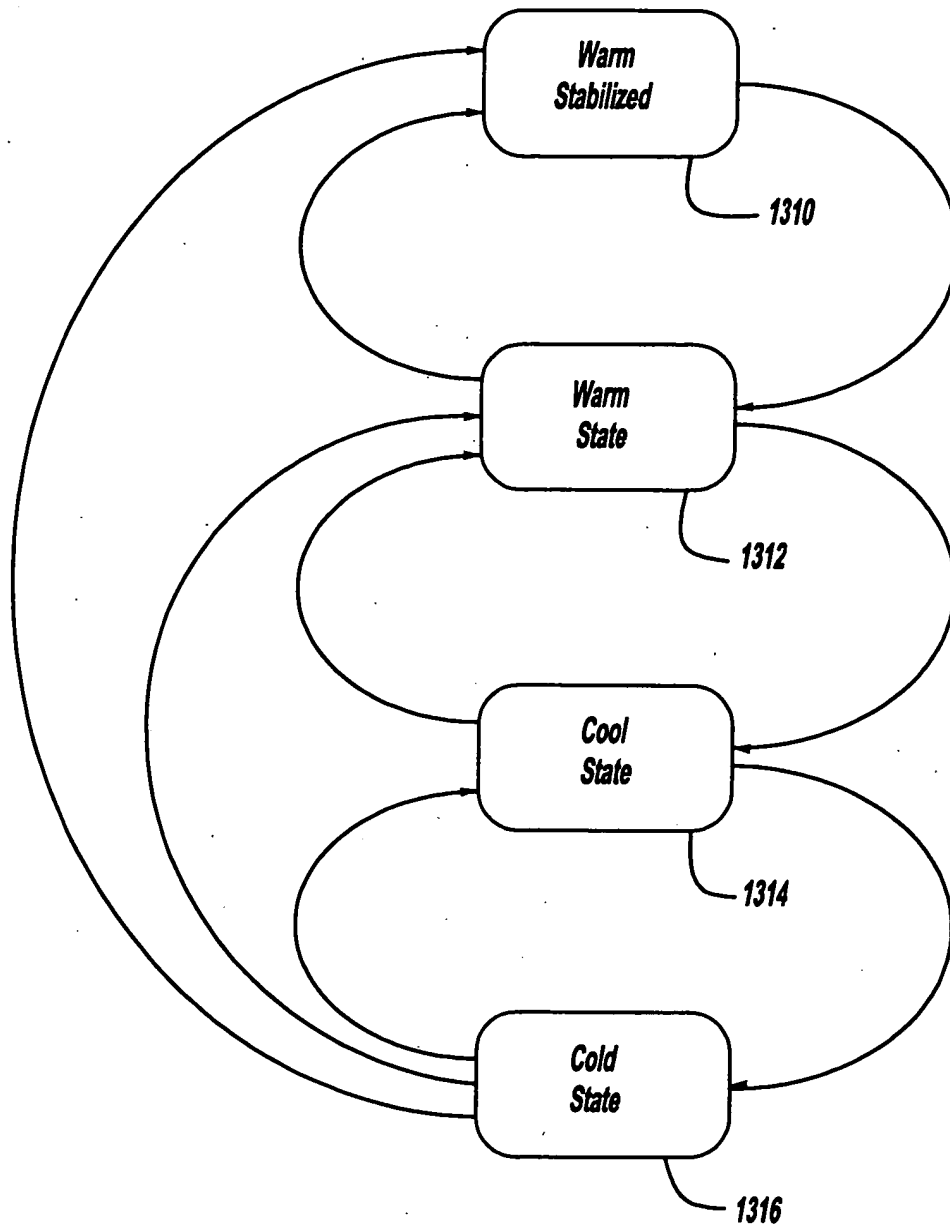


FIG - 13

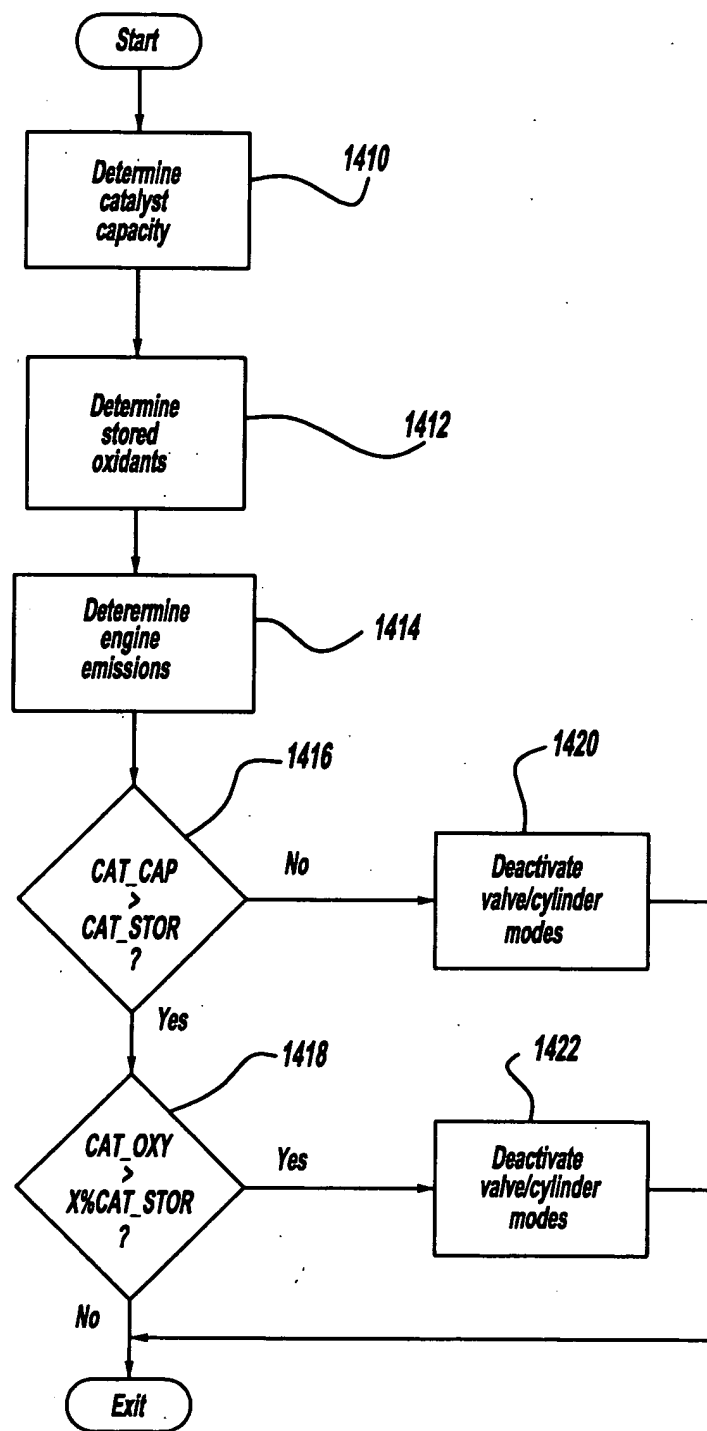
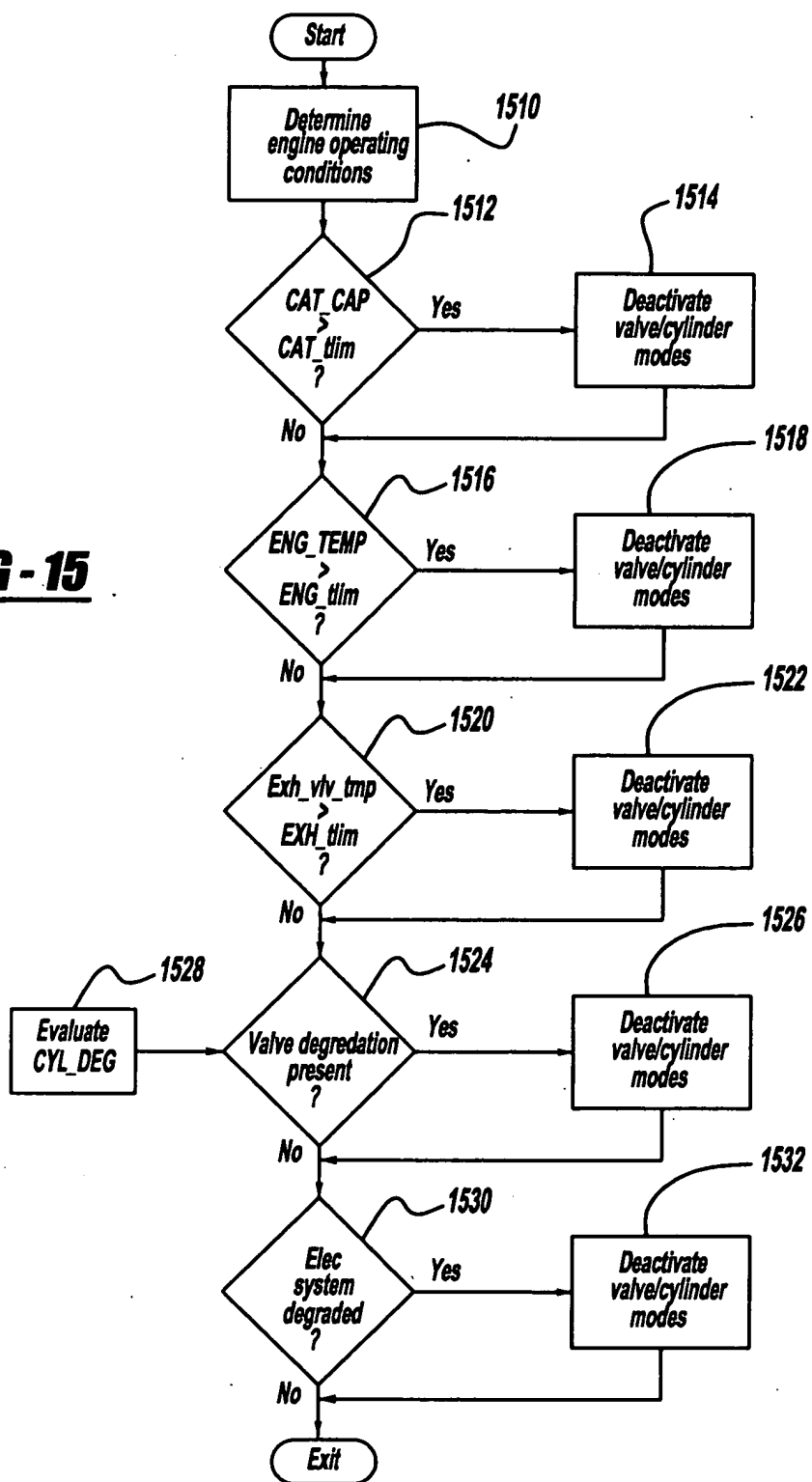
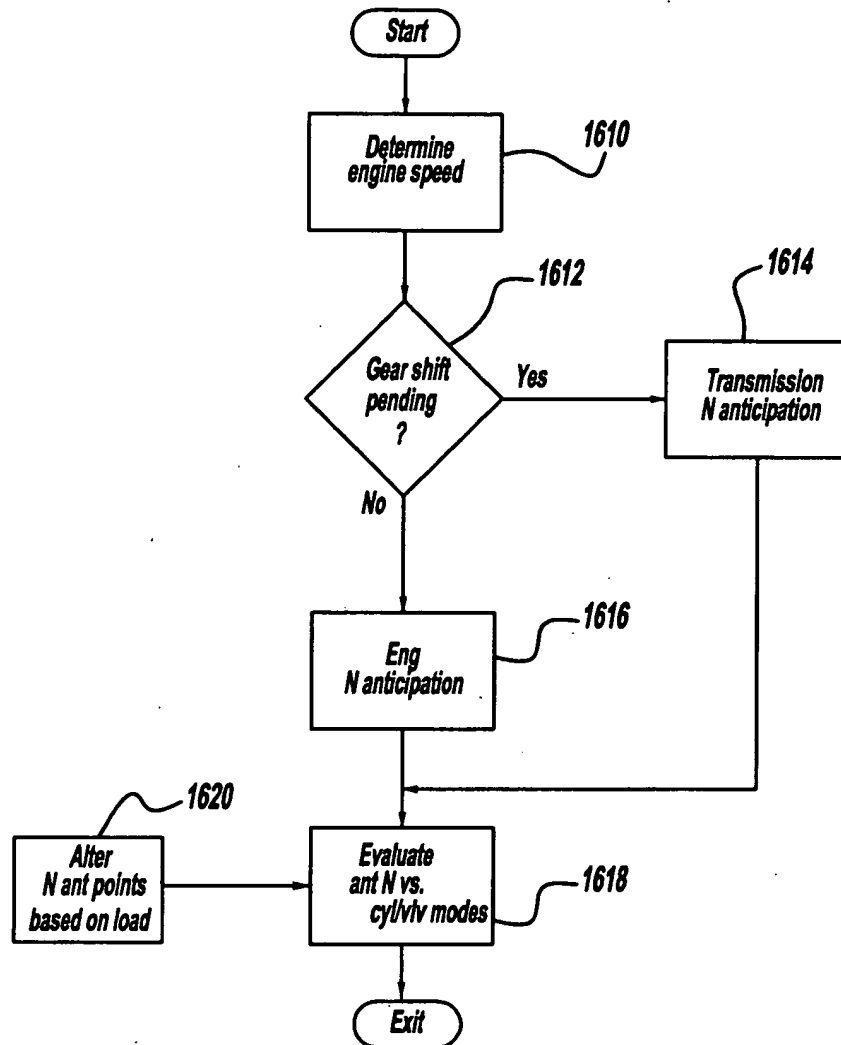
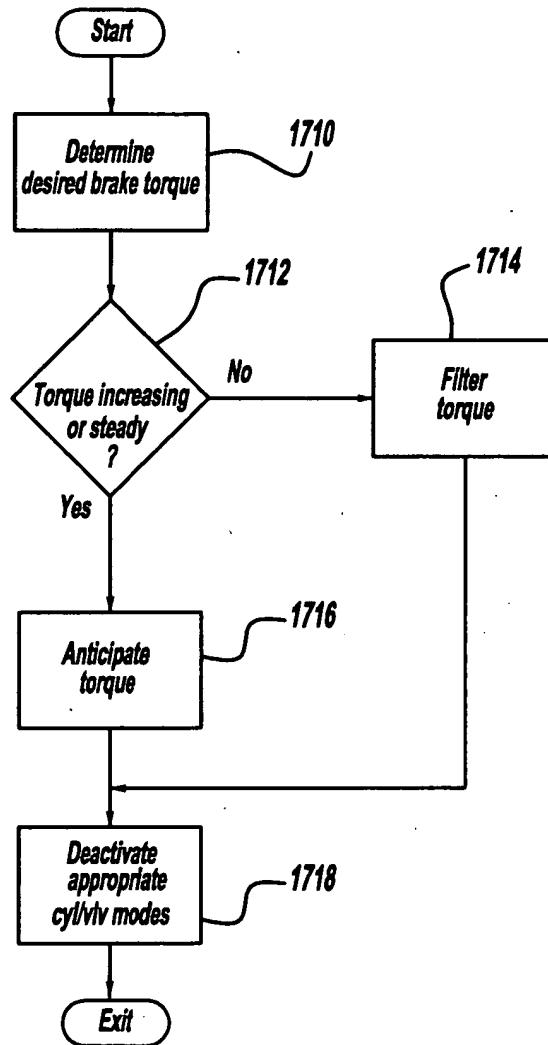
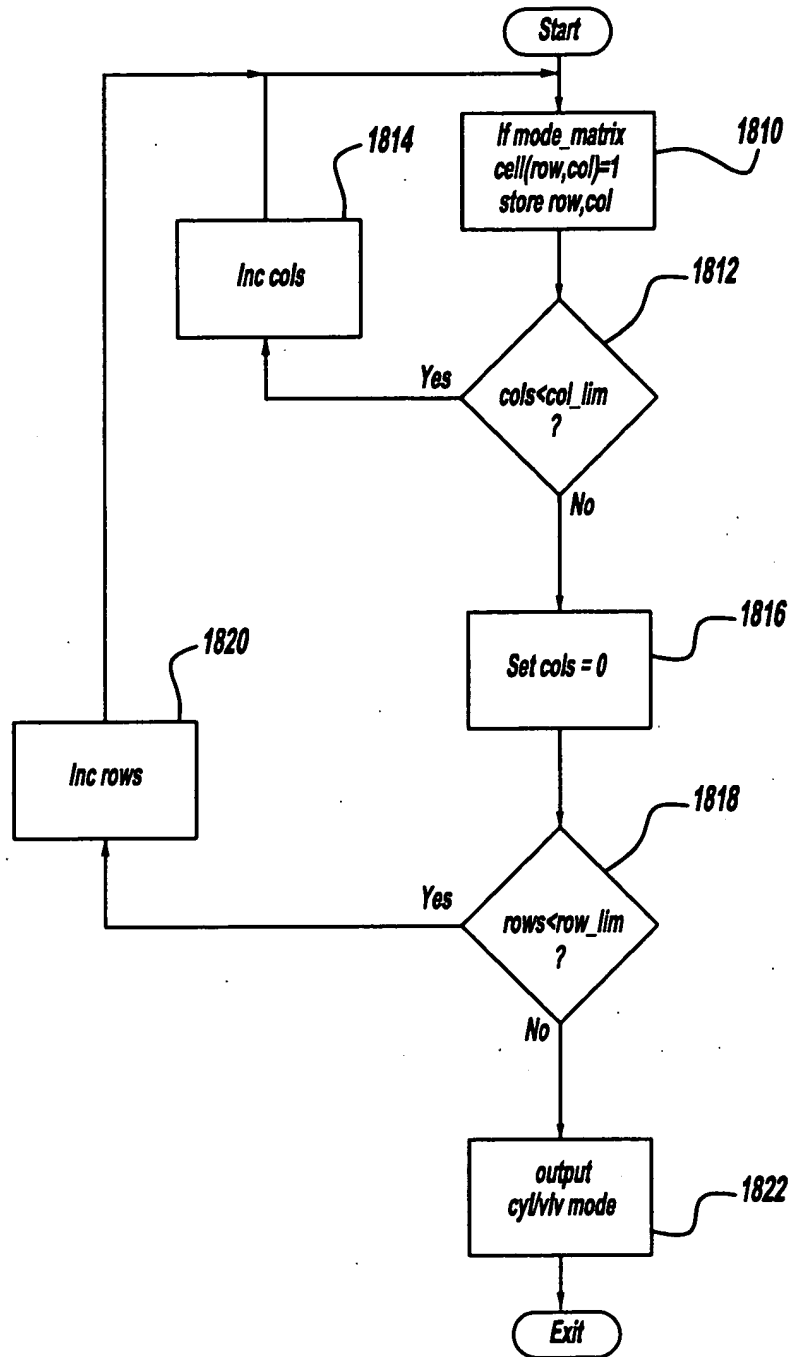
FIG - 14

FIG - 15

**FIG - 16**

**FIG - 17**



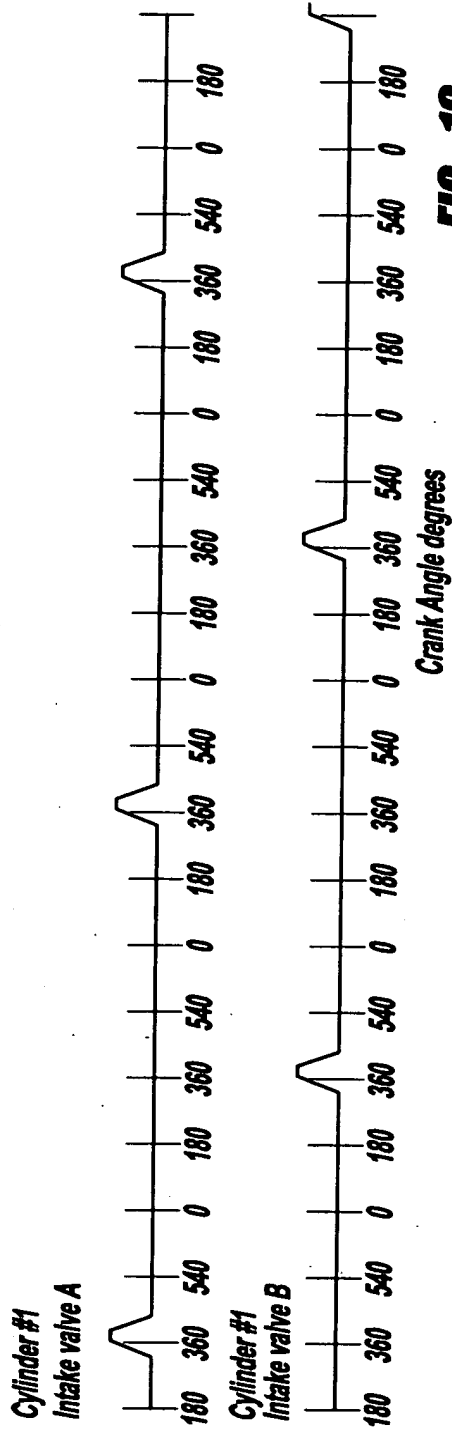


FIG - 19

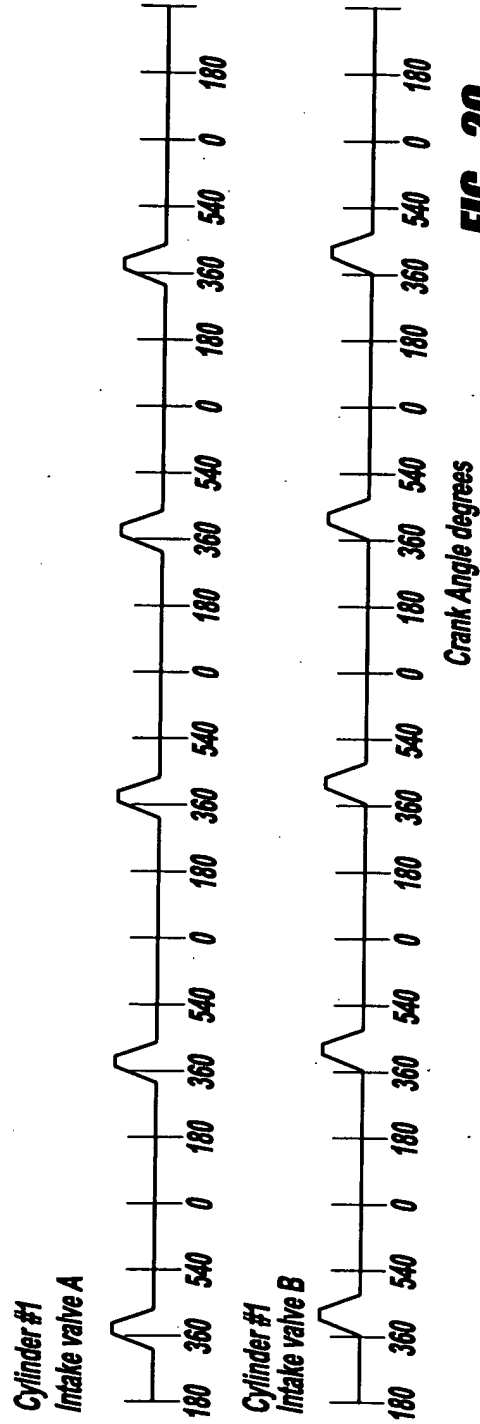


FIG - 20

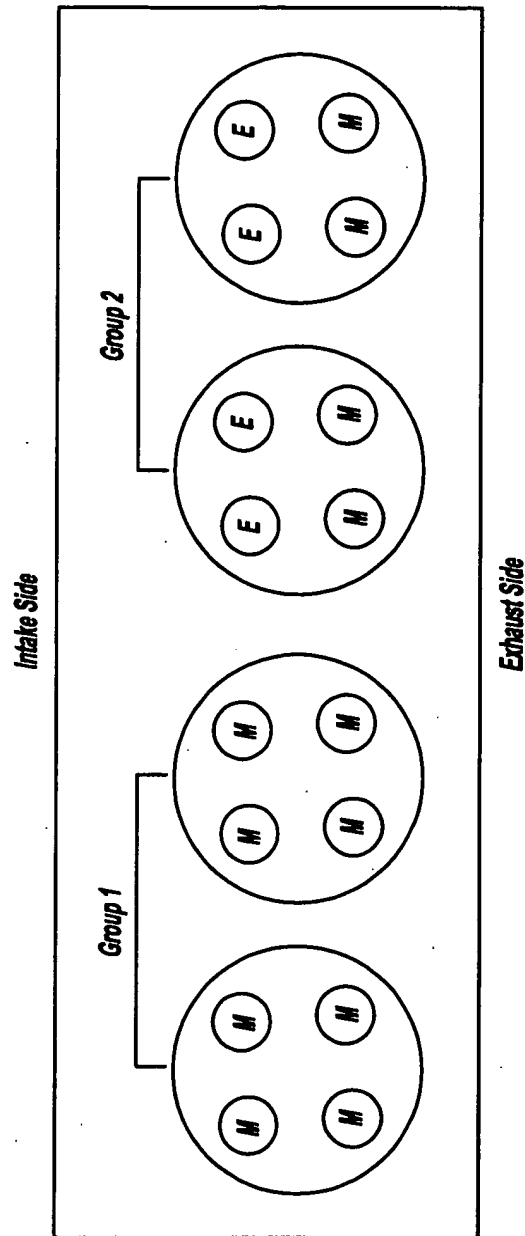


FIG - 21

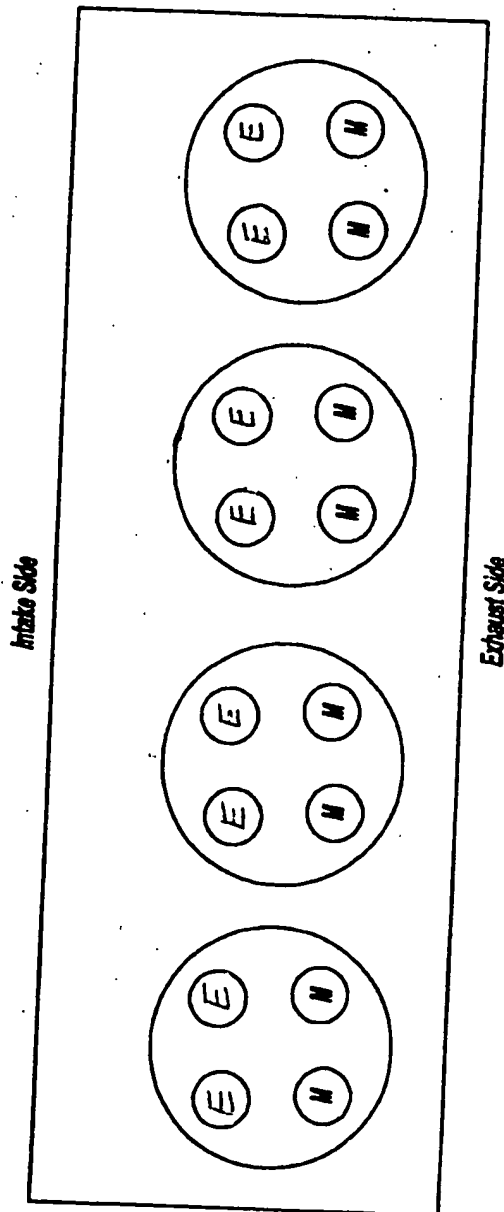


FIG - 21A

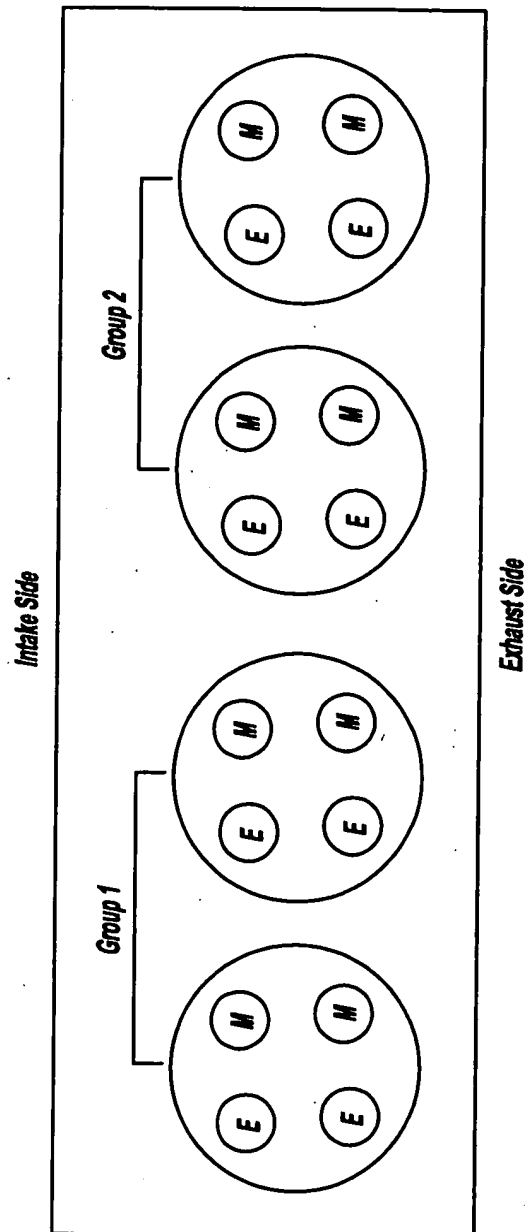


FIG - 22

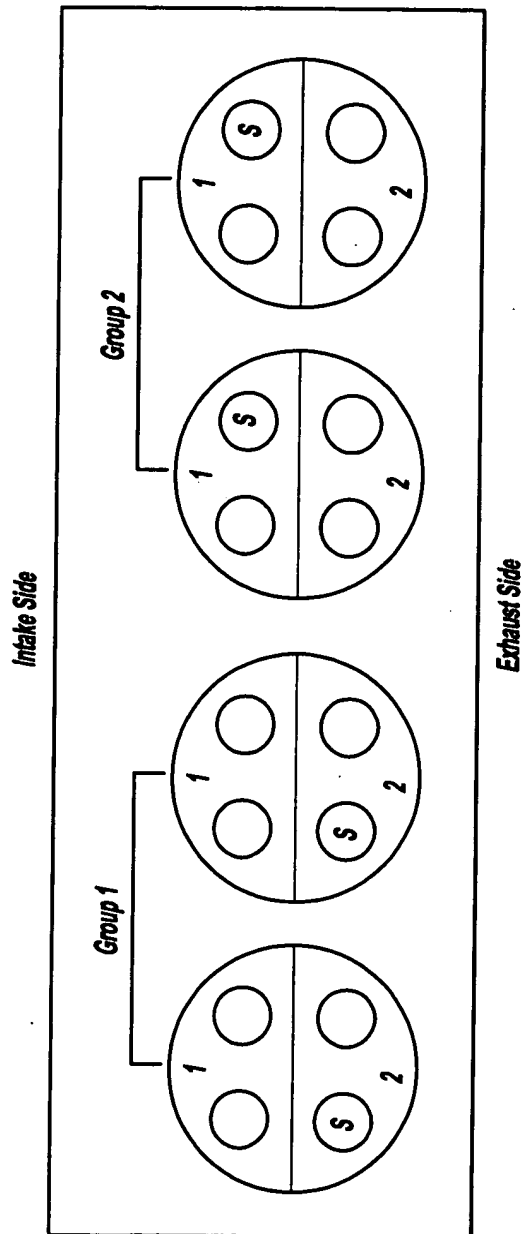


FIG - 23

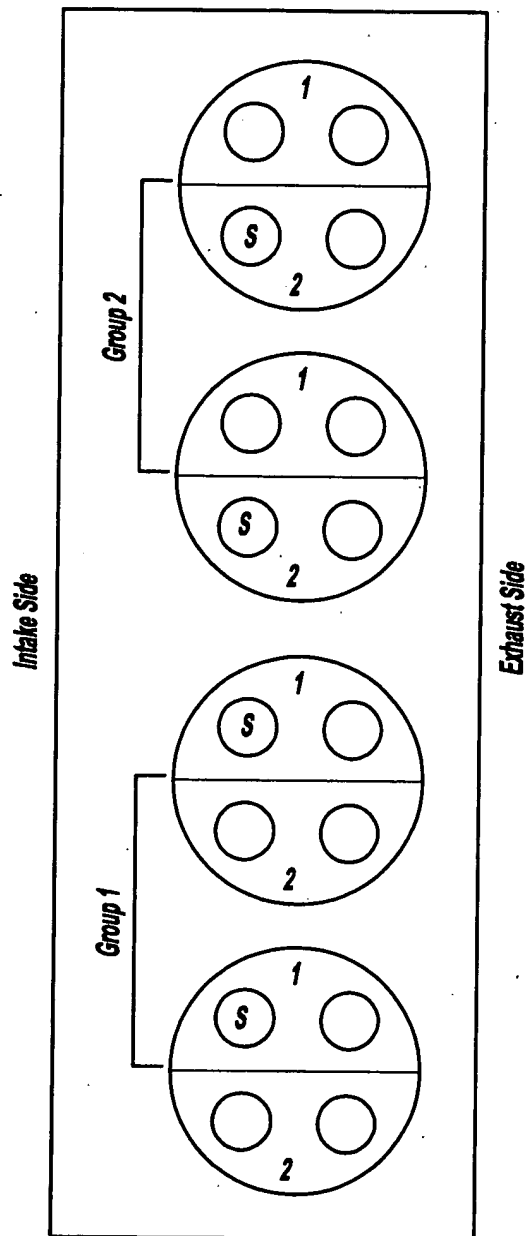


FIG - 24

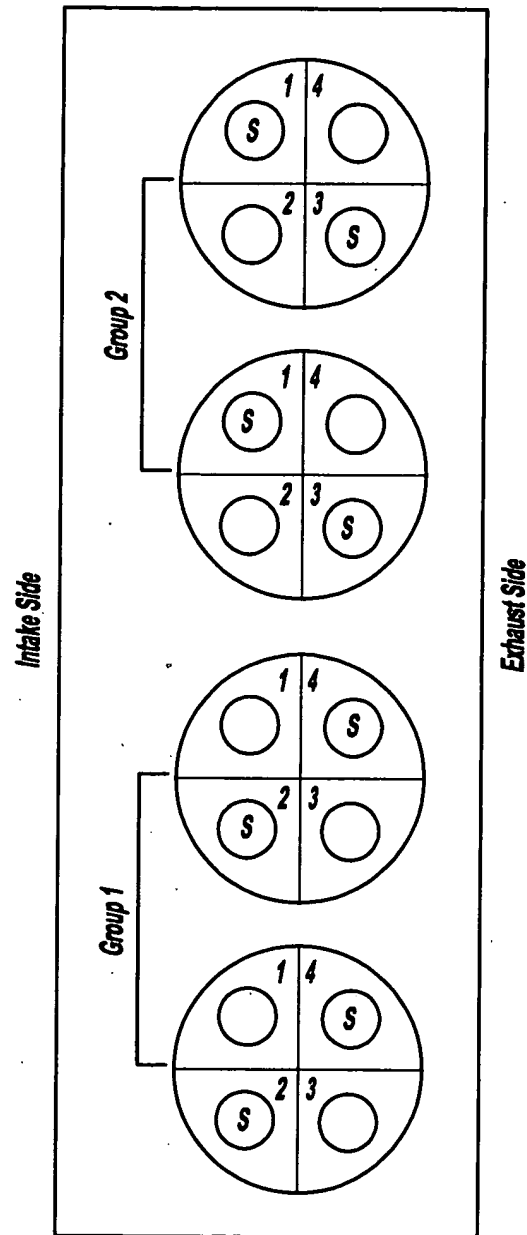


FIG - 25

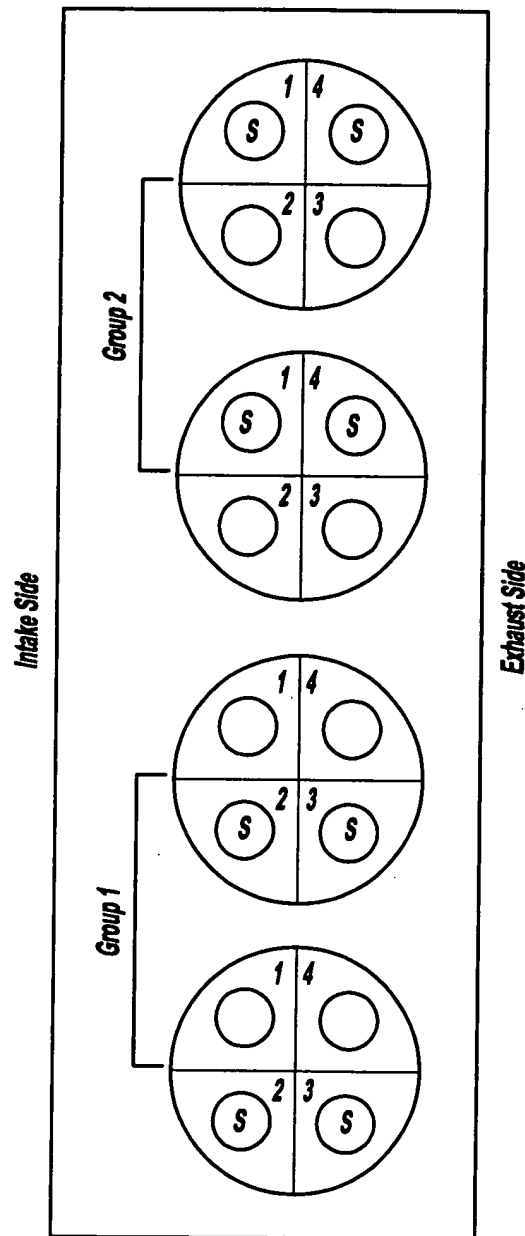


FIG - 26

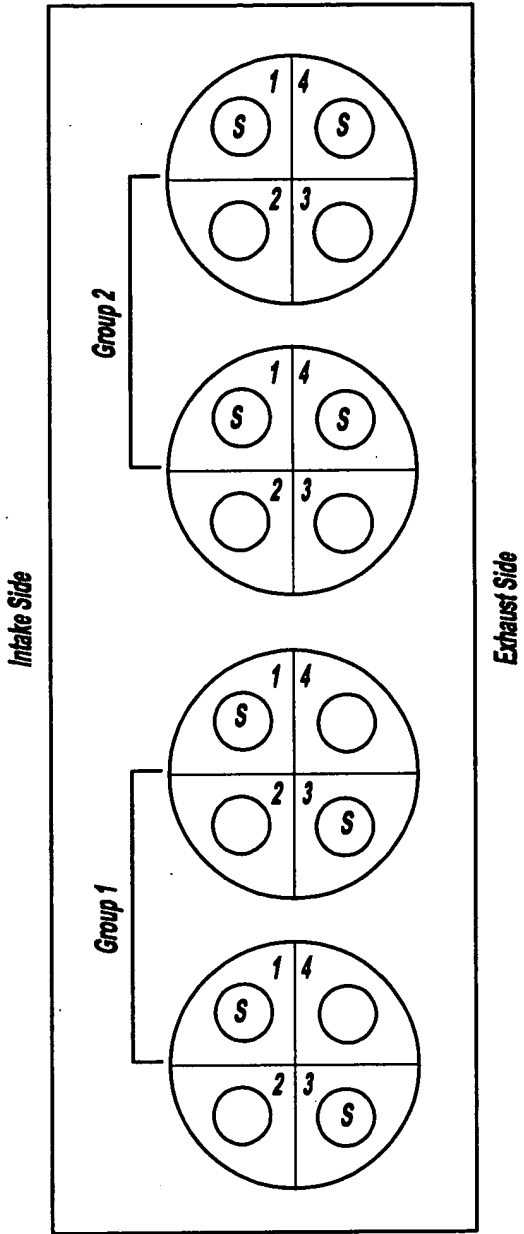
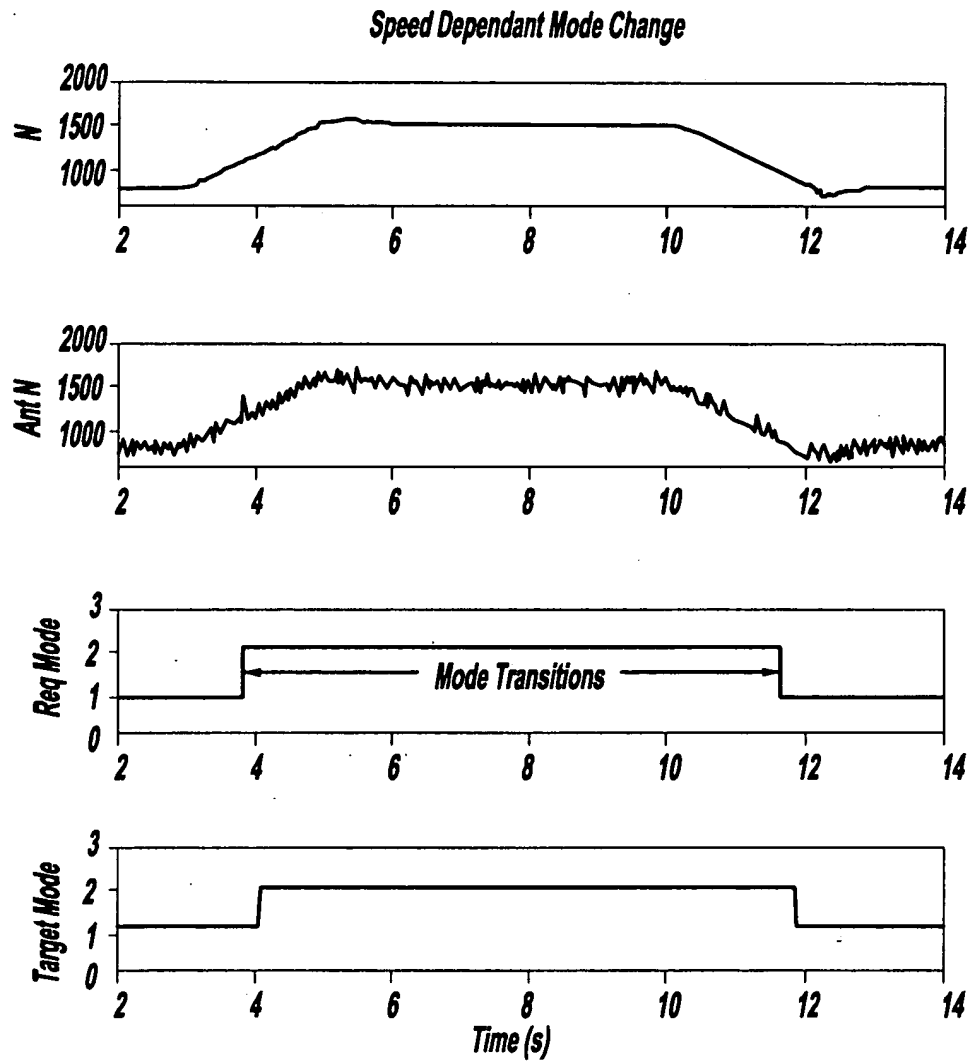


FIG - 27

**FIG - 28**

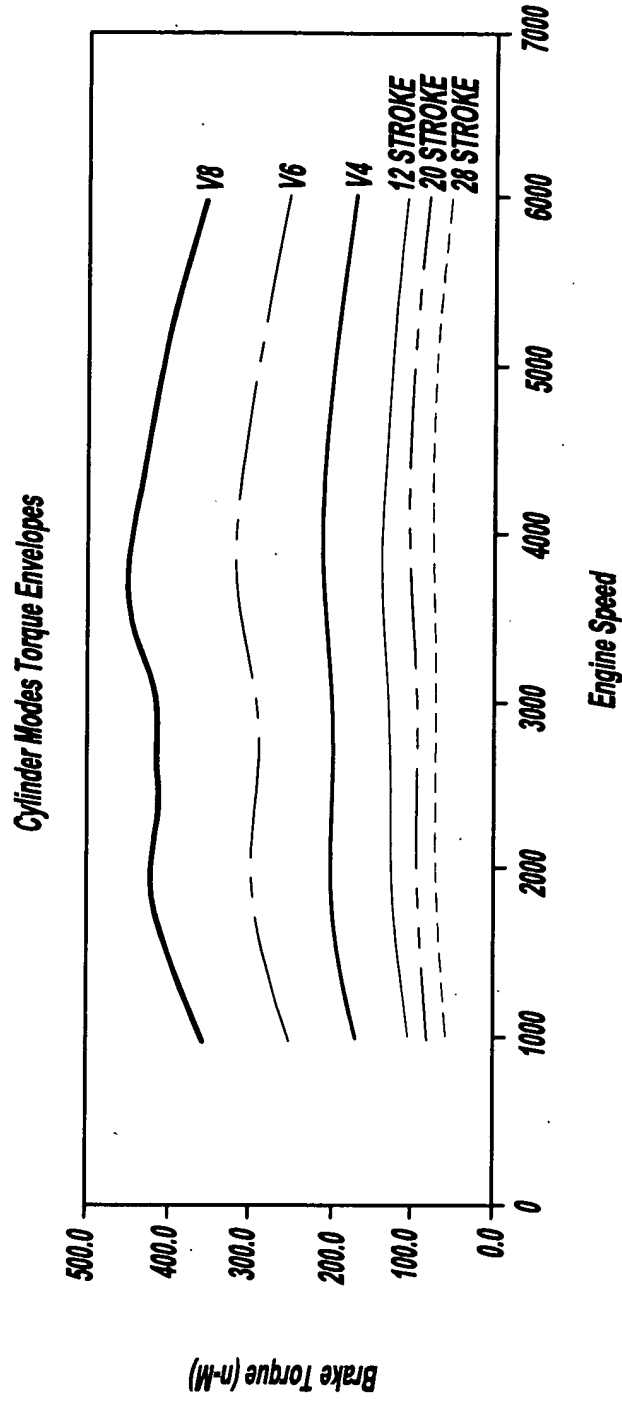


FIG - 29

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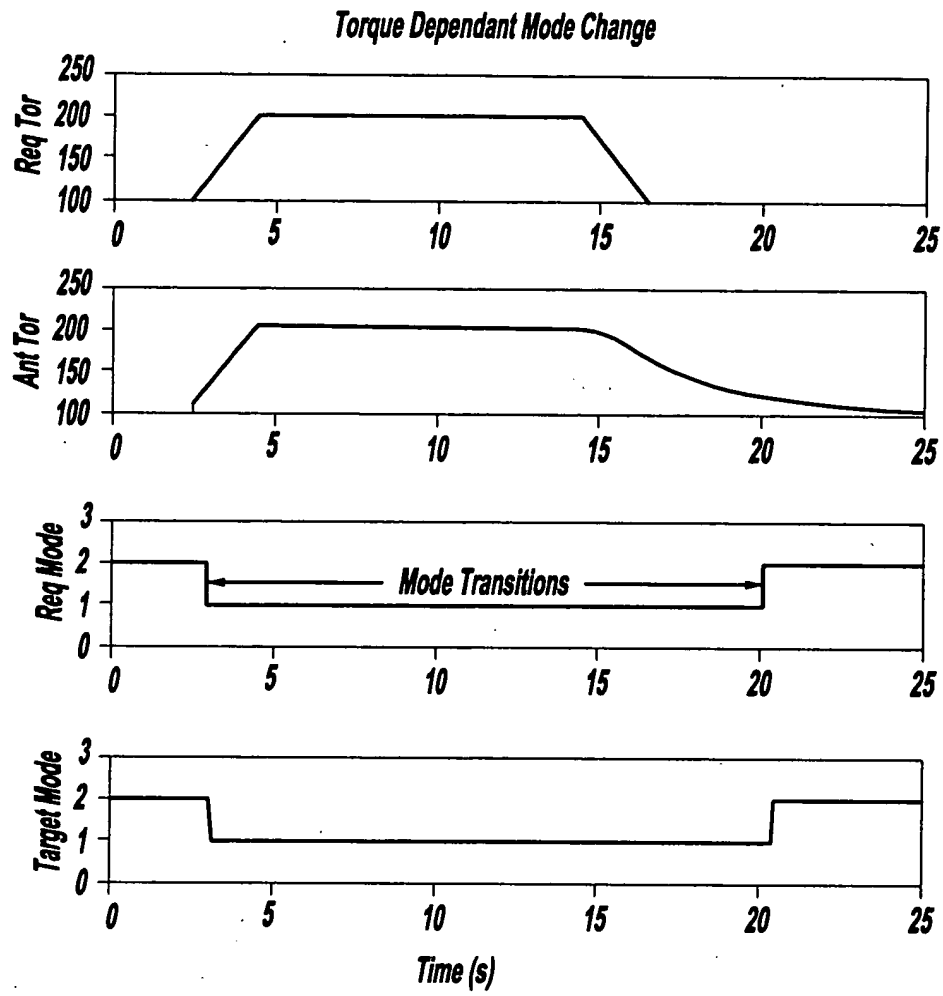
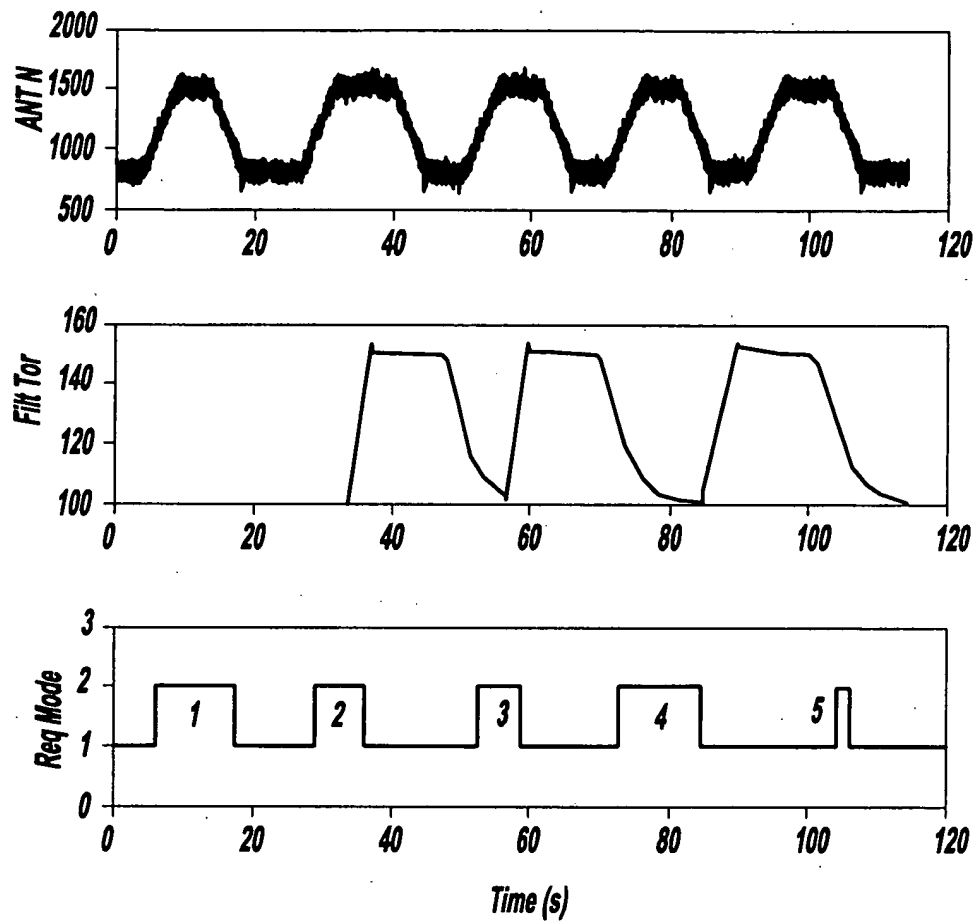
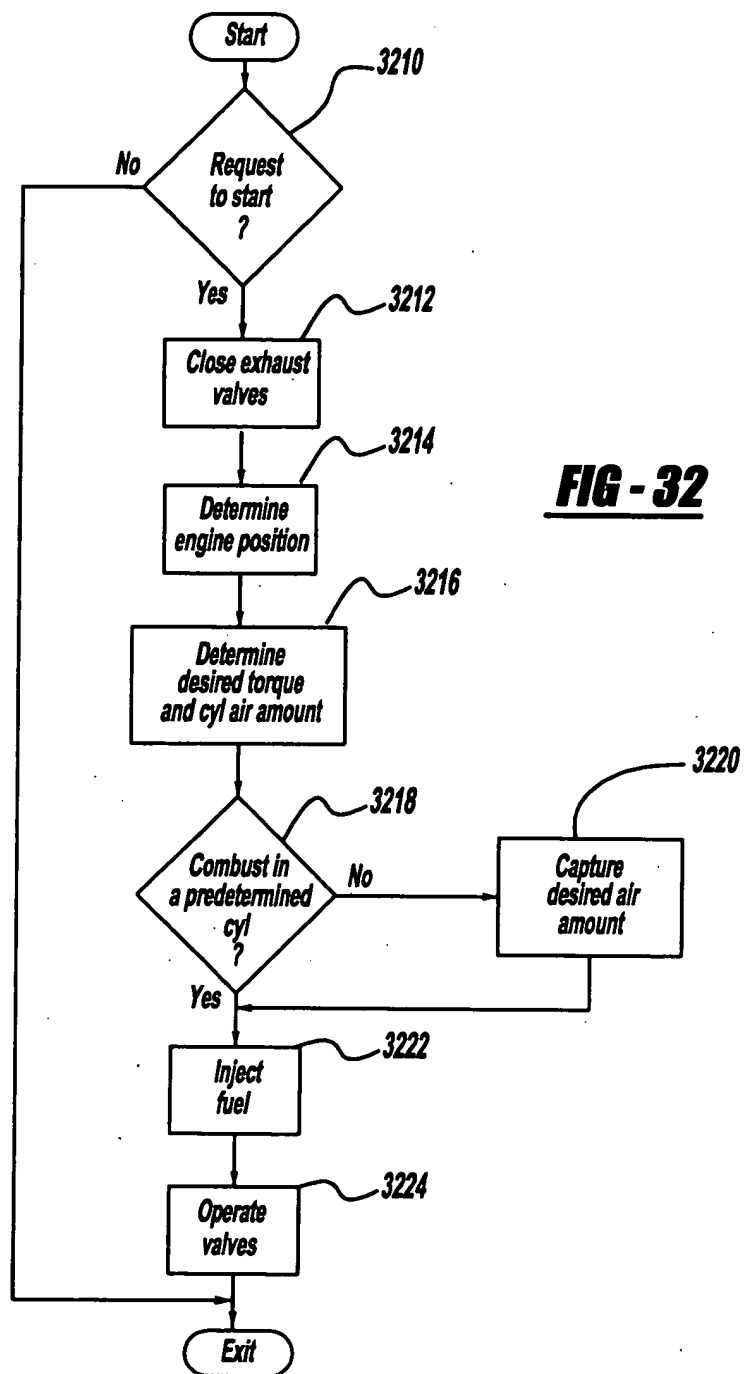


FIG - 30

Speed and Torque Dependant Mode Changes**FIG - 31**



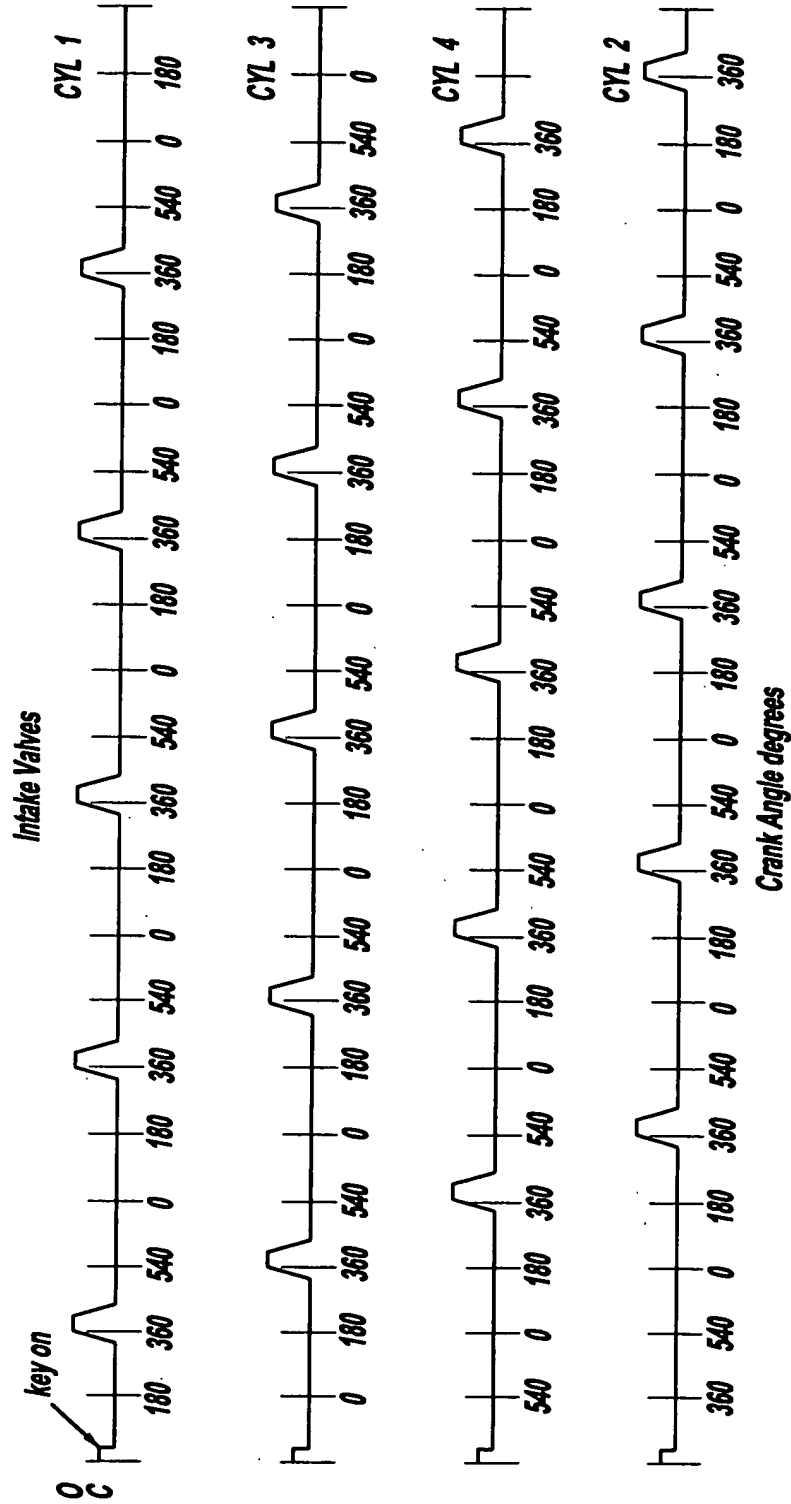
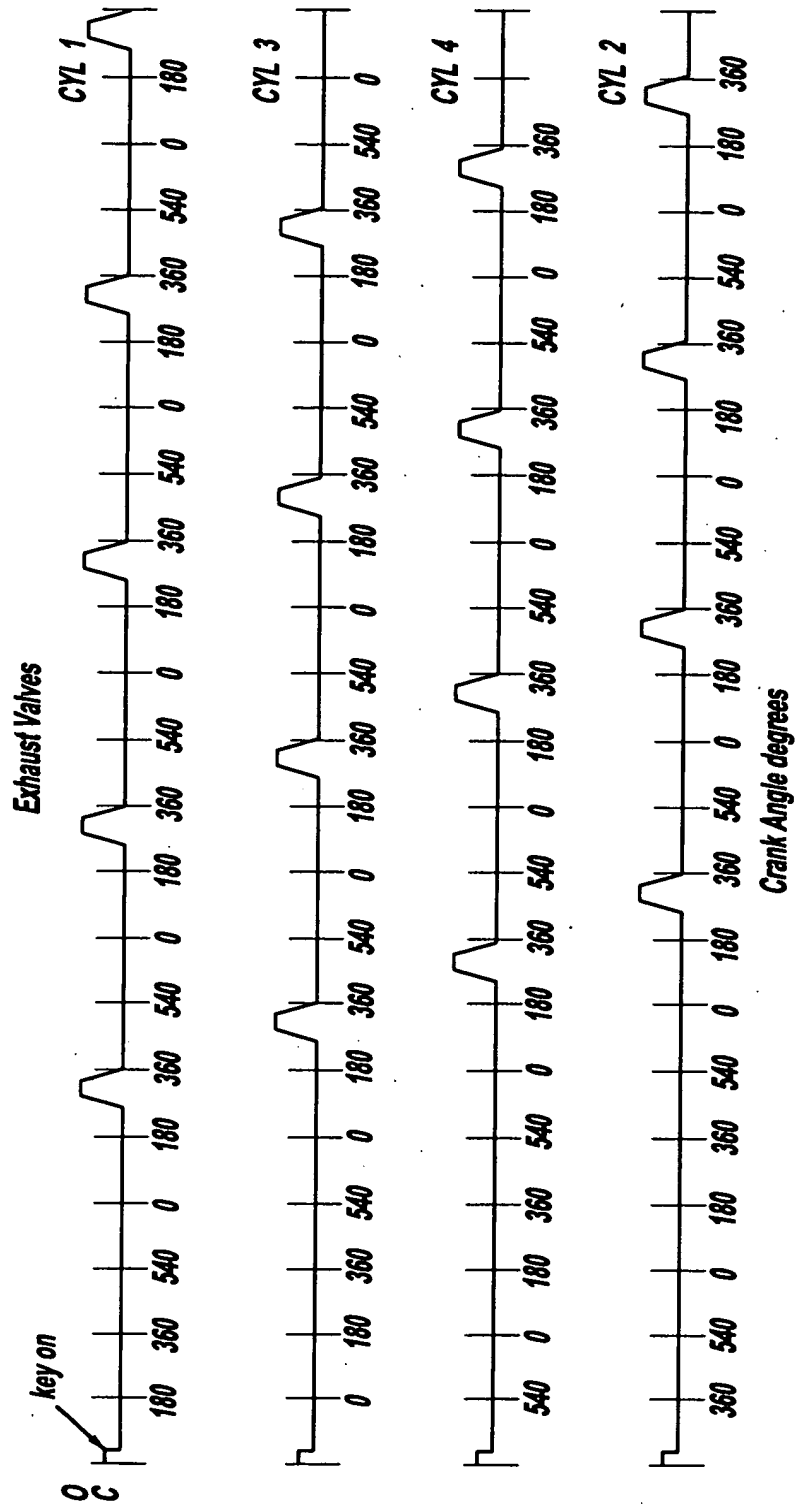


FIG - 33a

**FIG - 33b**

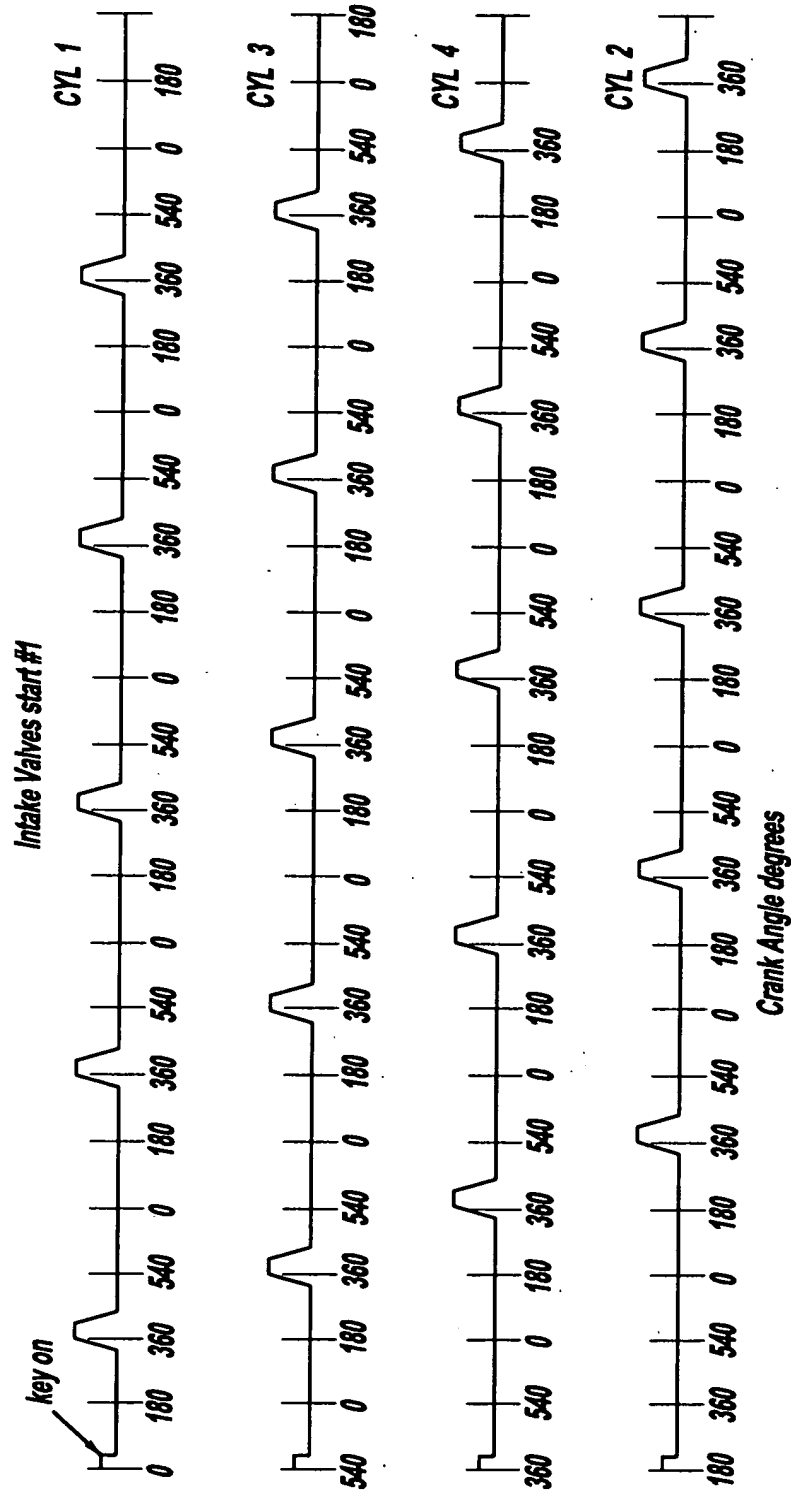


FIG - 34a

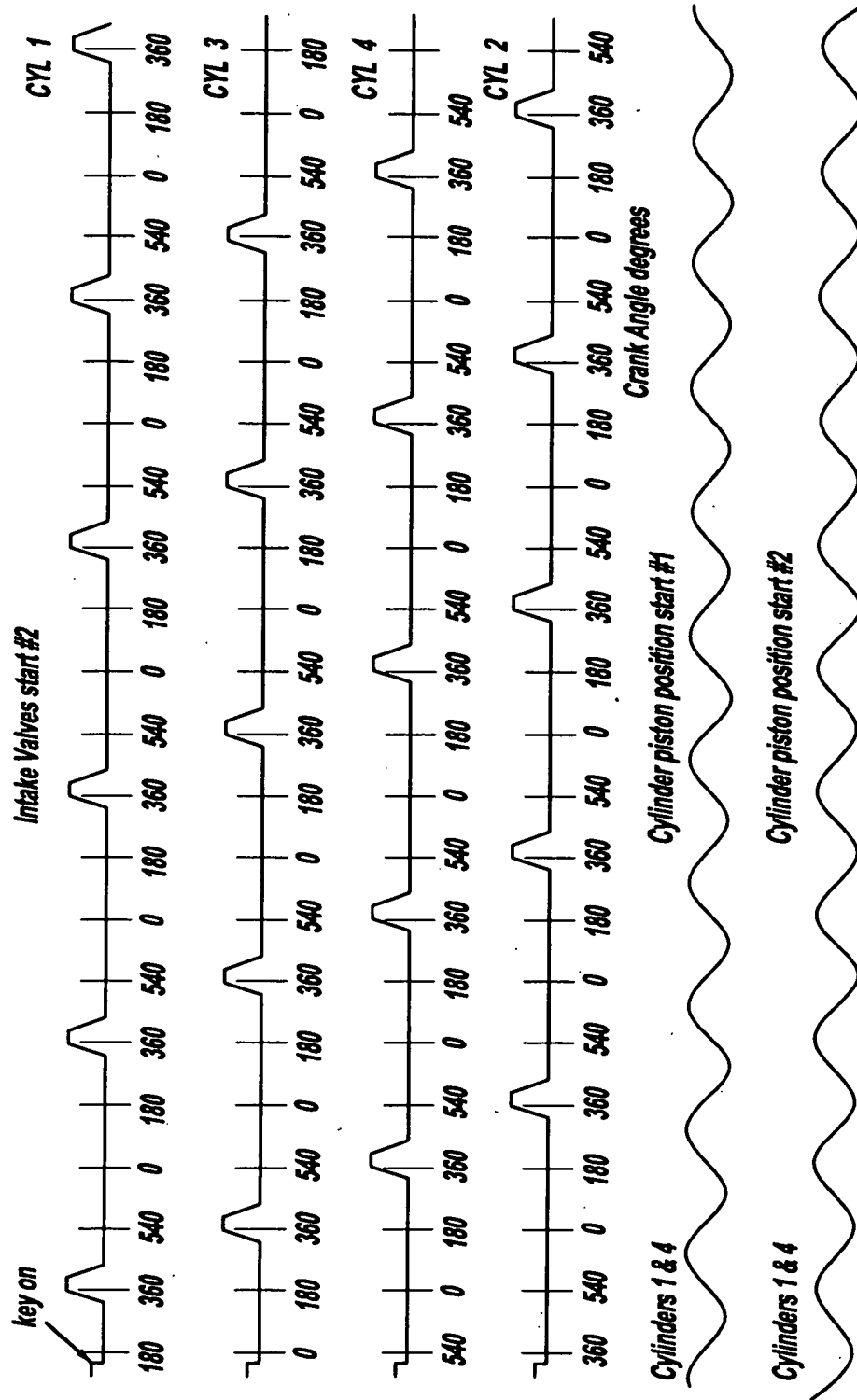
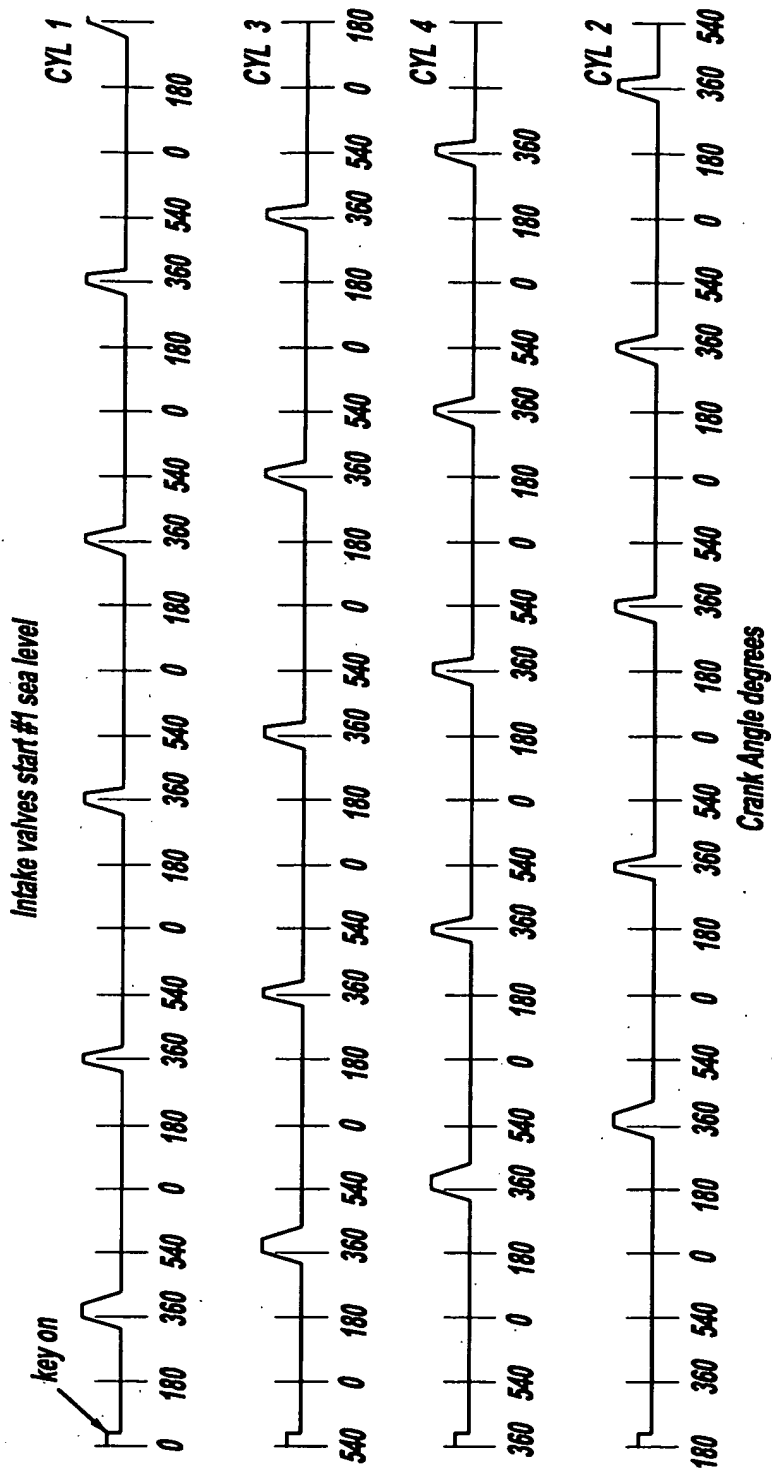
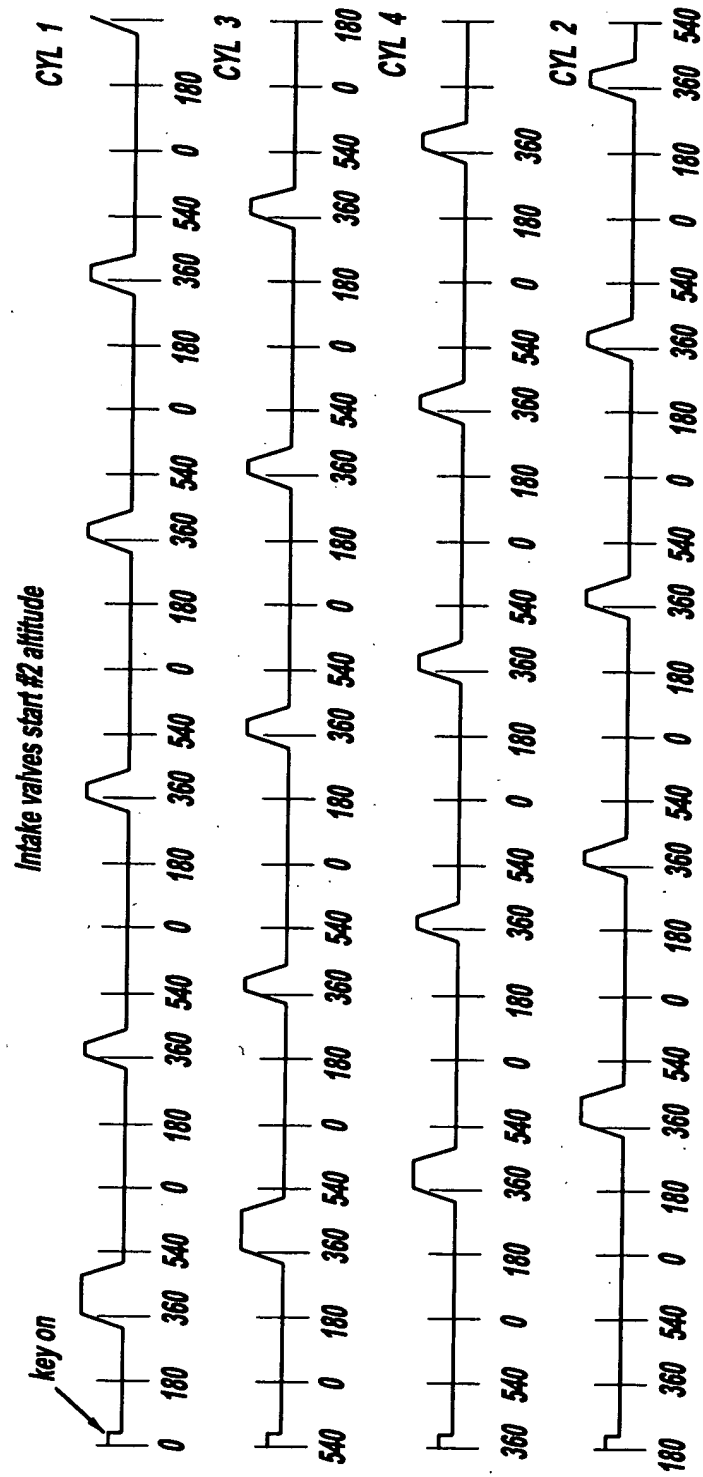
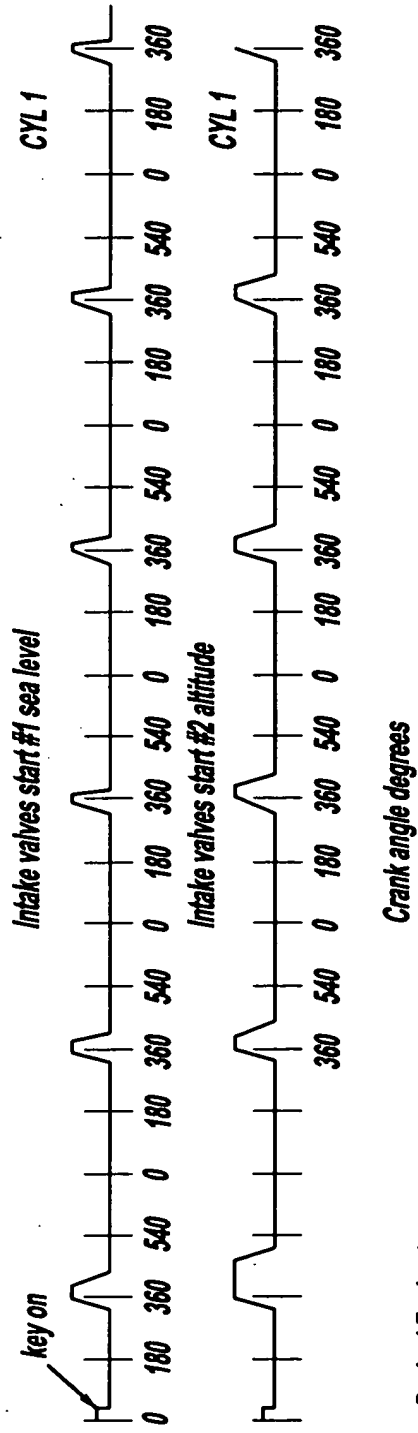


FIG - 34b

**FIG - 35a**

**FIG - 35b**

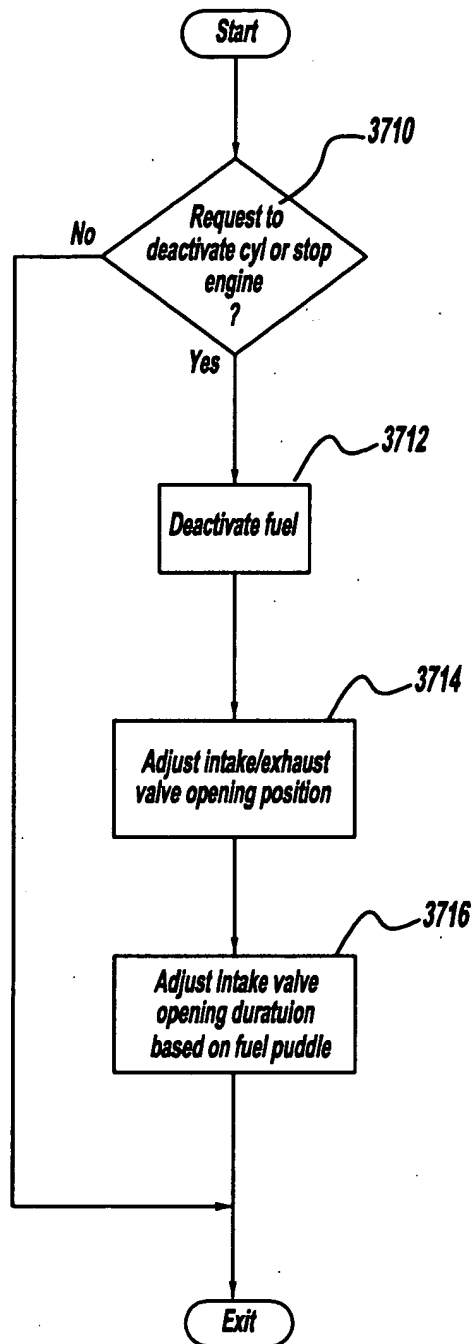


Crank angle degrees

Desired Engine torque

Engine Speed

FIG - 36

**FIG - 37**

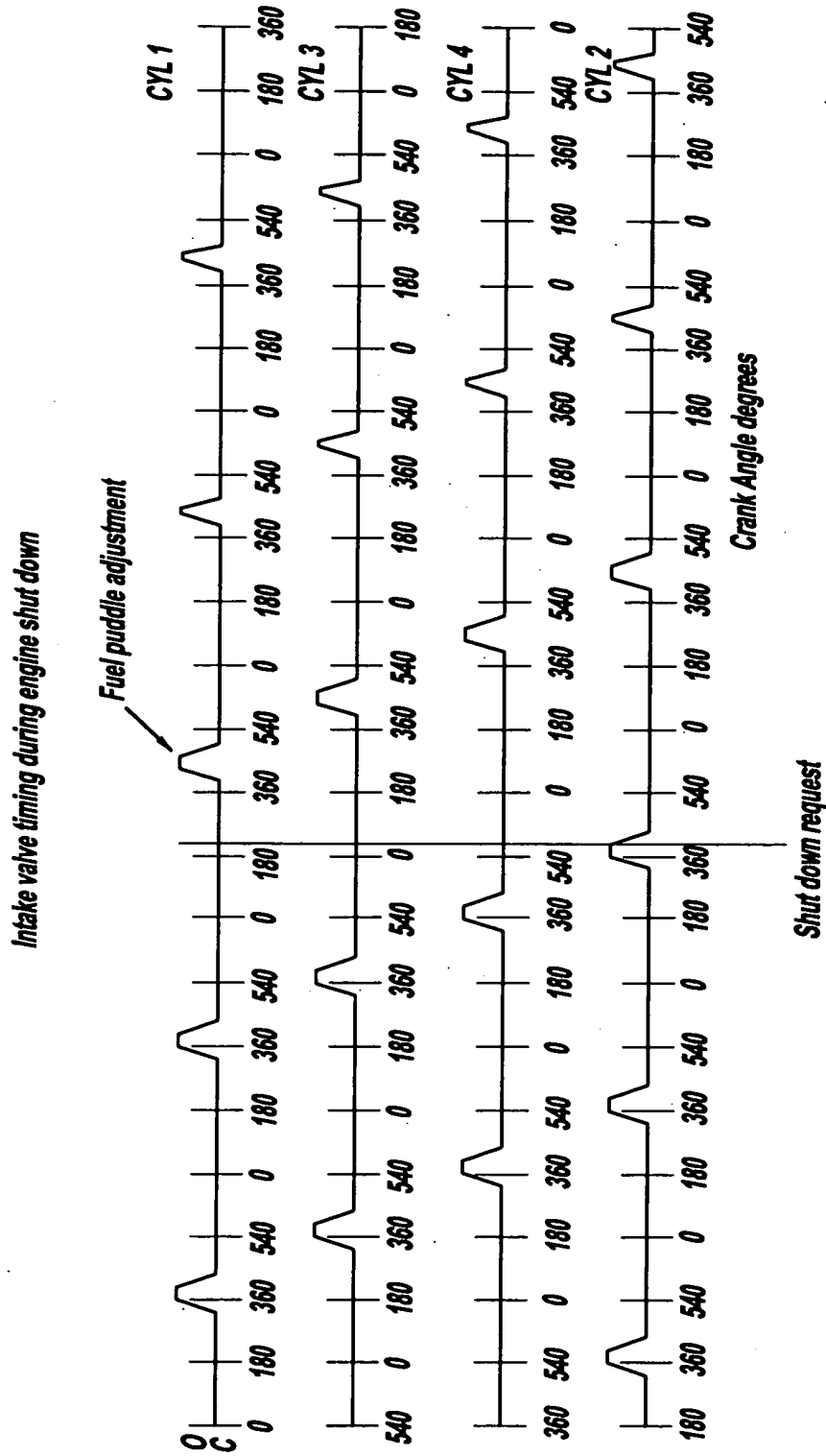
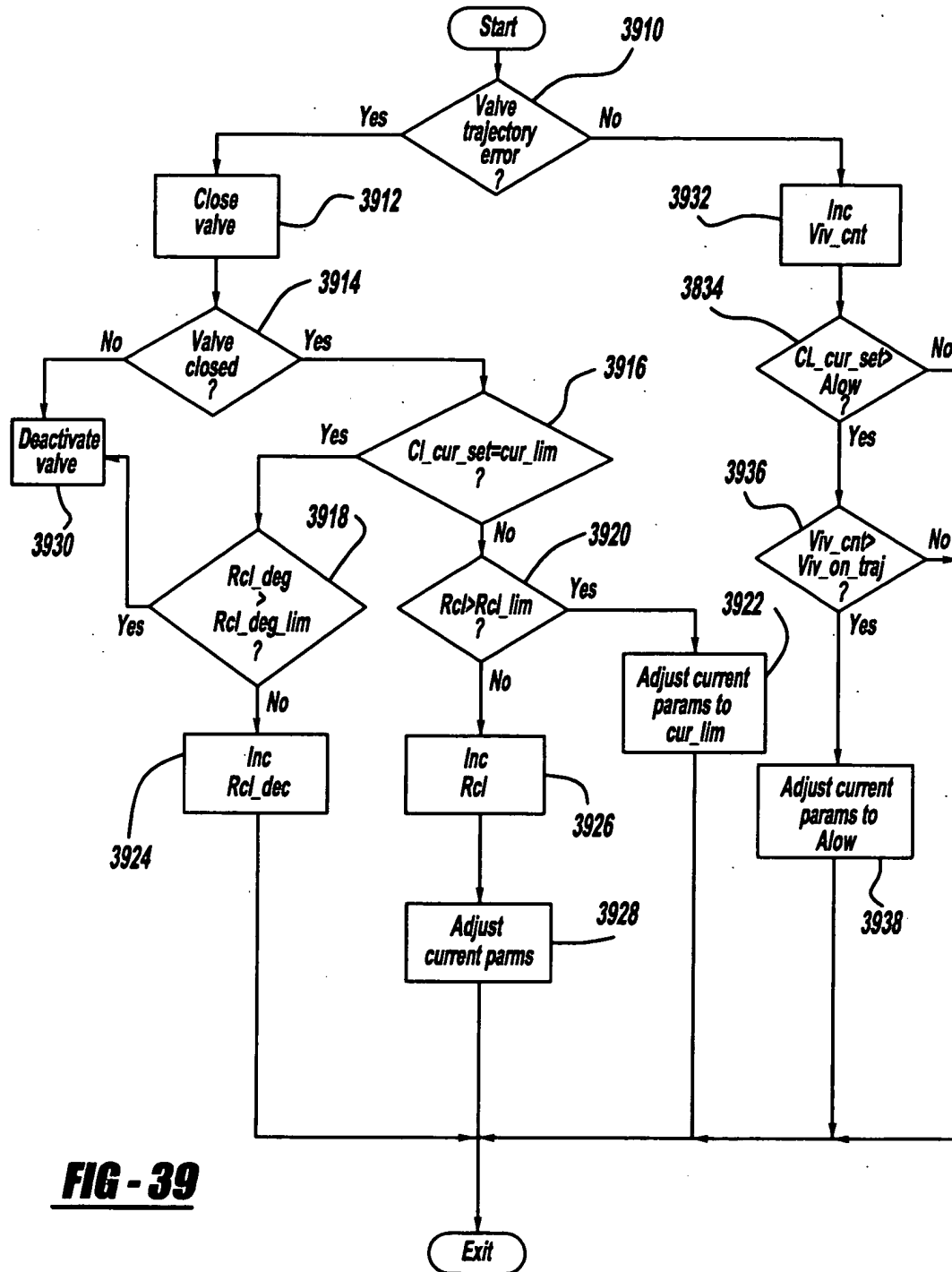


FIG - 38



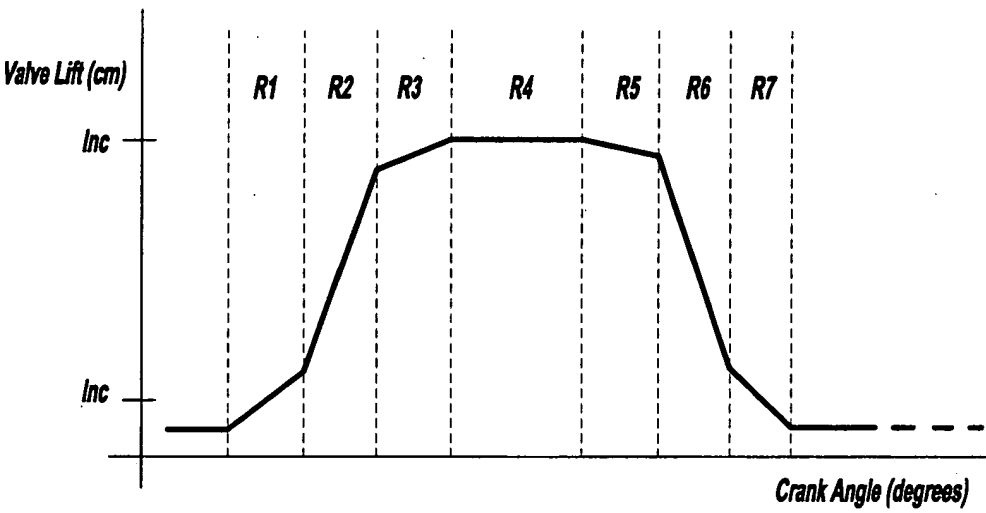


FIG - 40

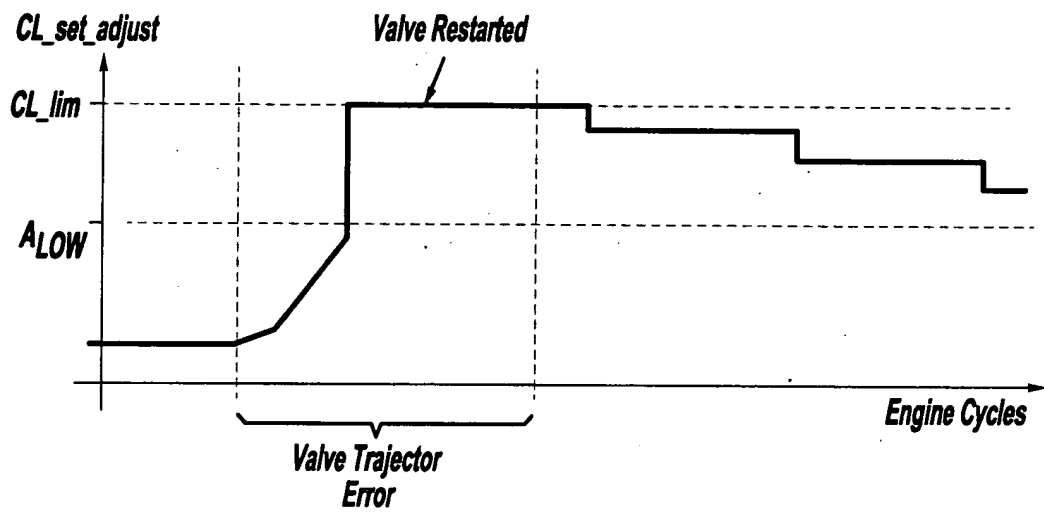
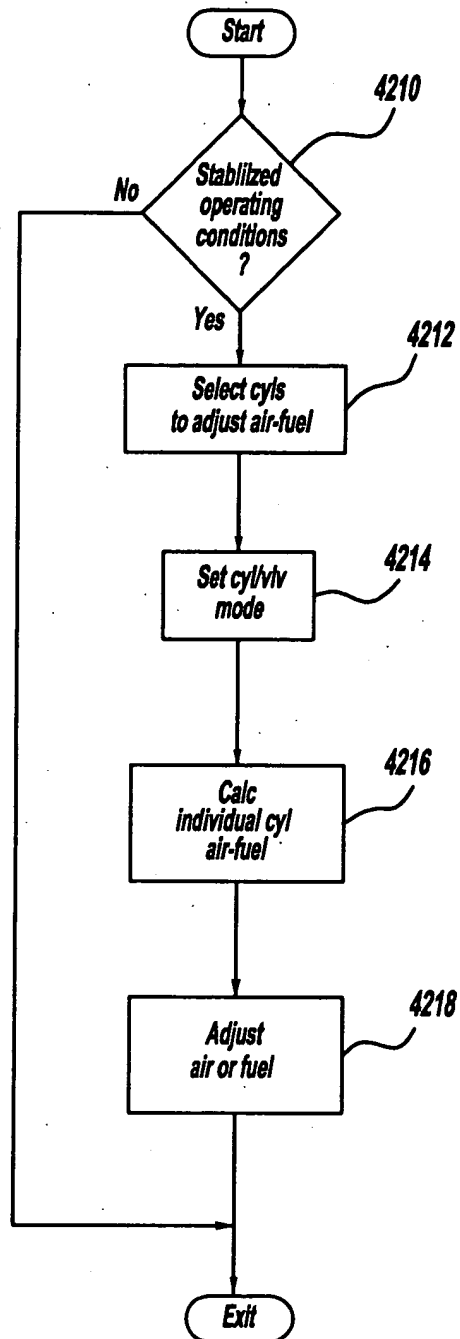


FIG - 41

**FIG - 42**

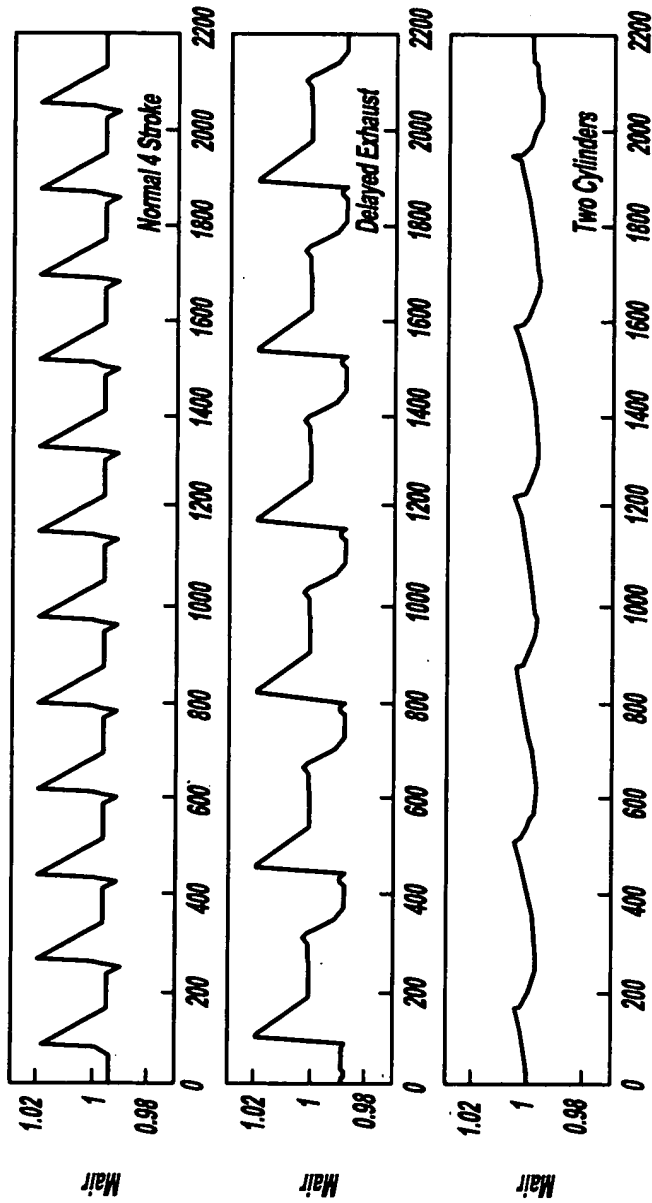


FIG - 43

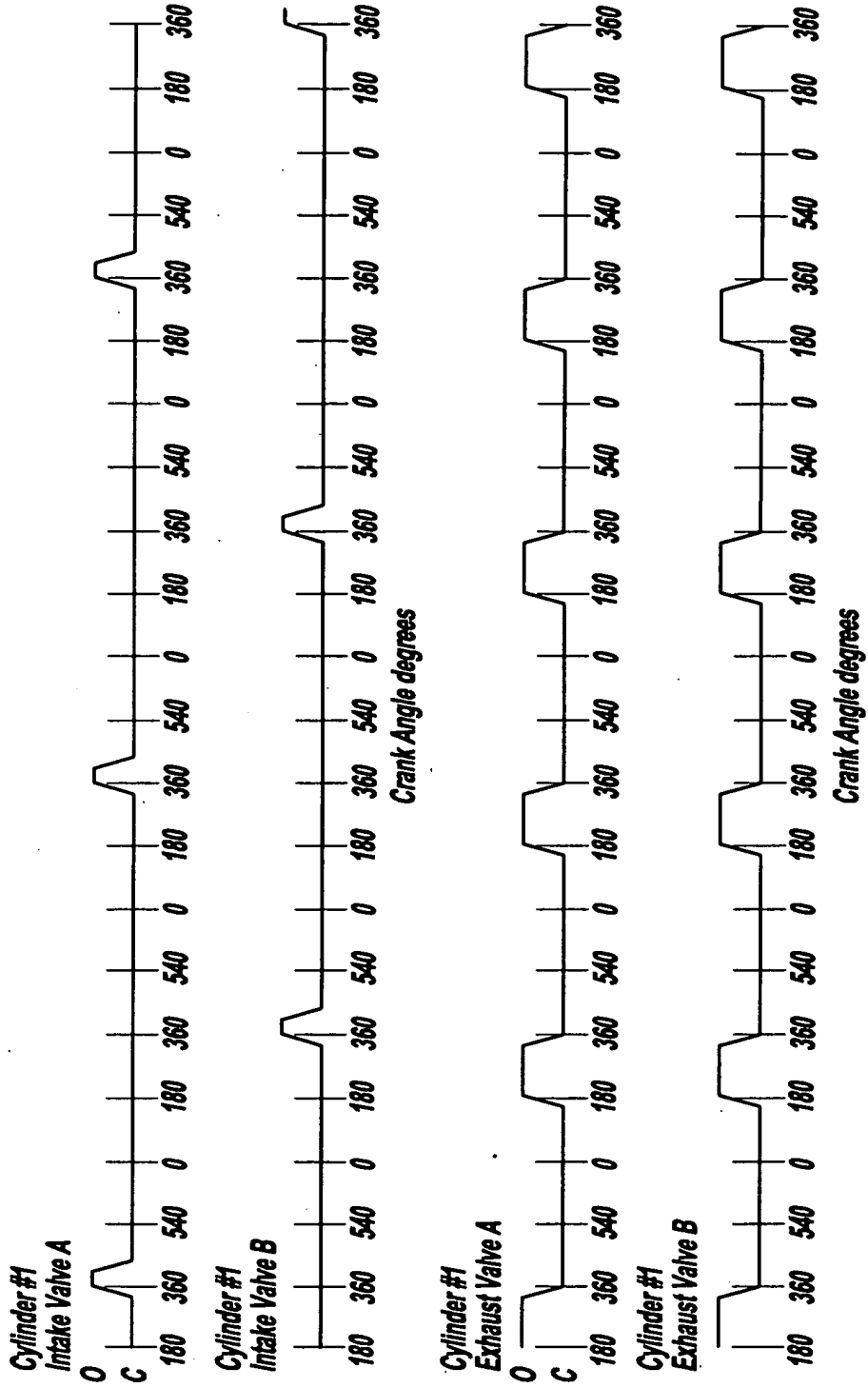


FIG - 44

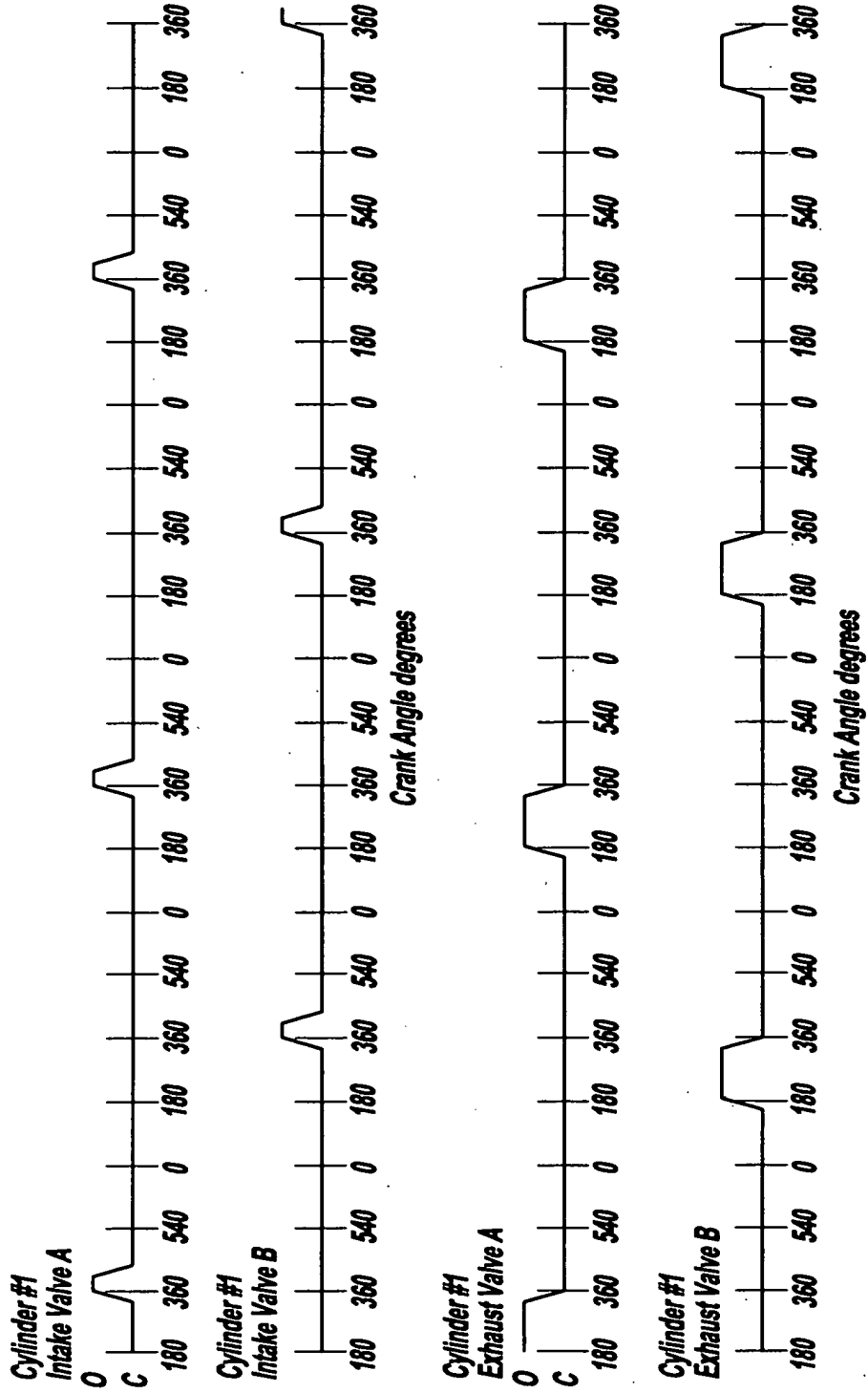


FIG - 45

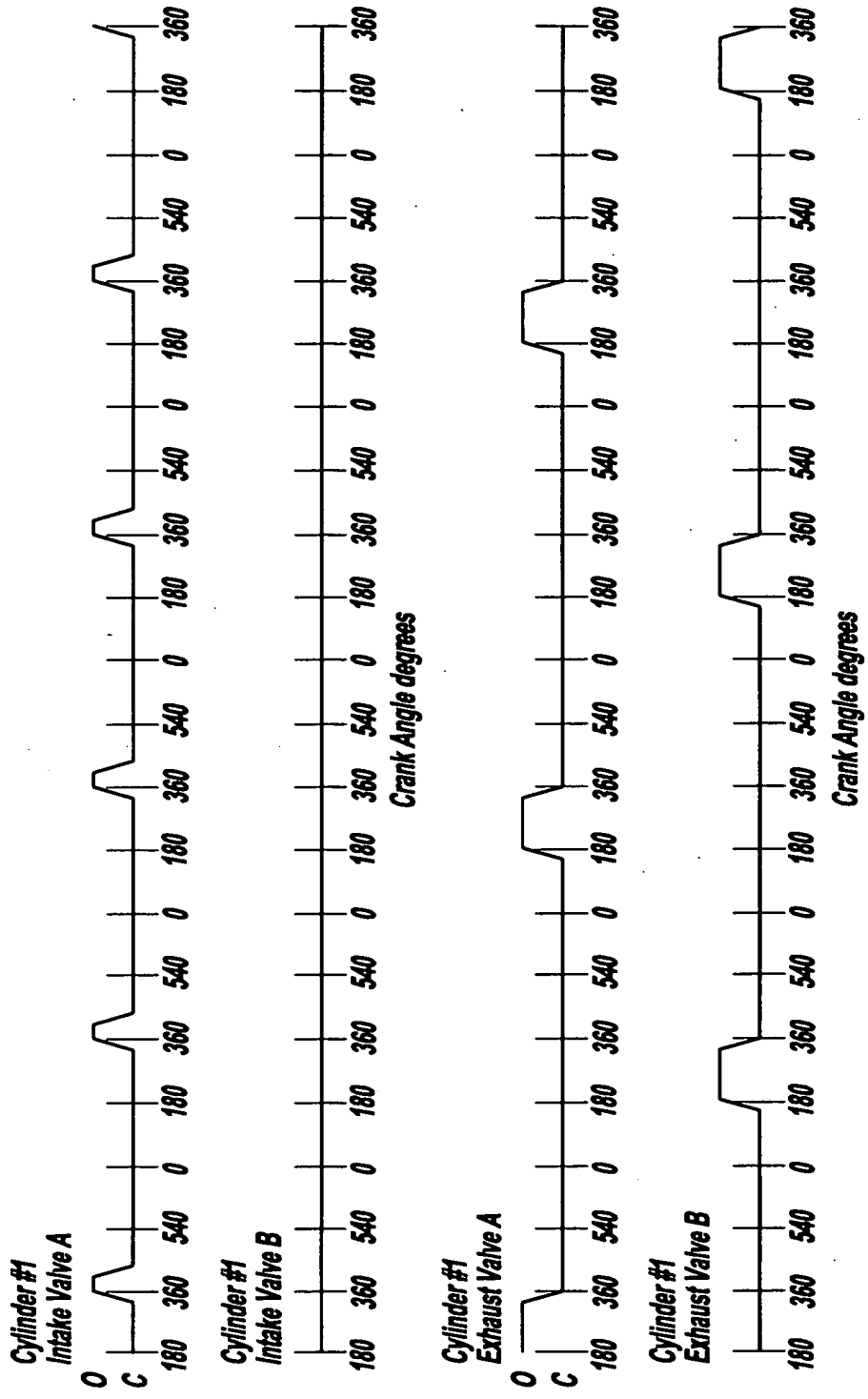


FIG - 46

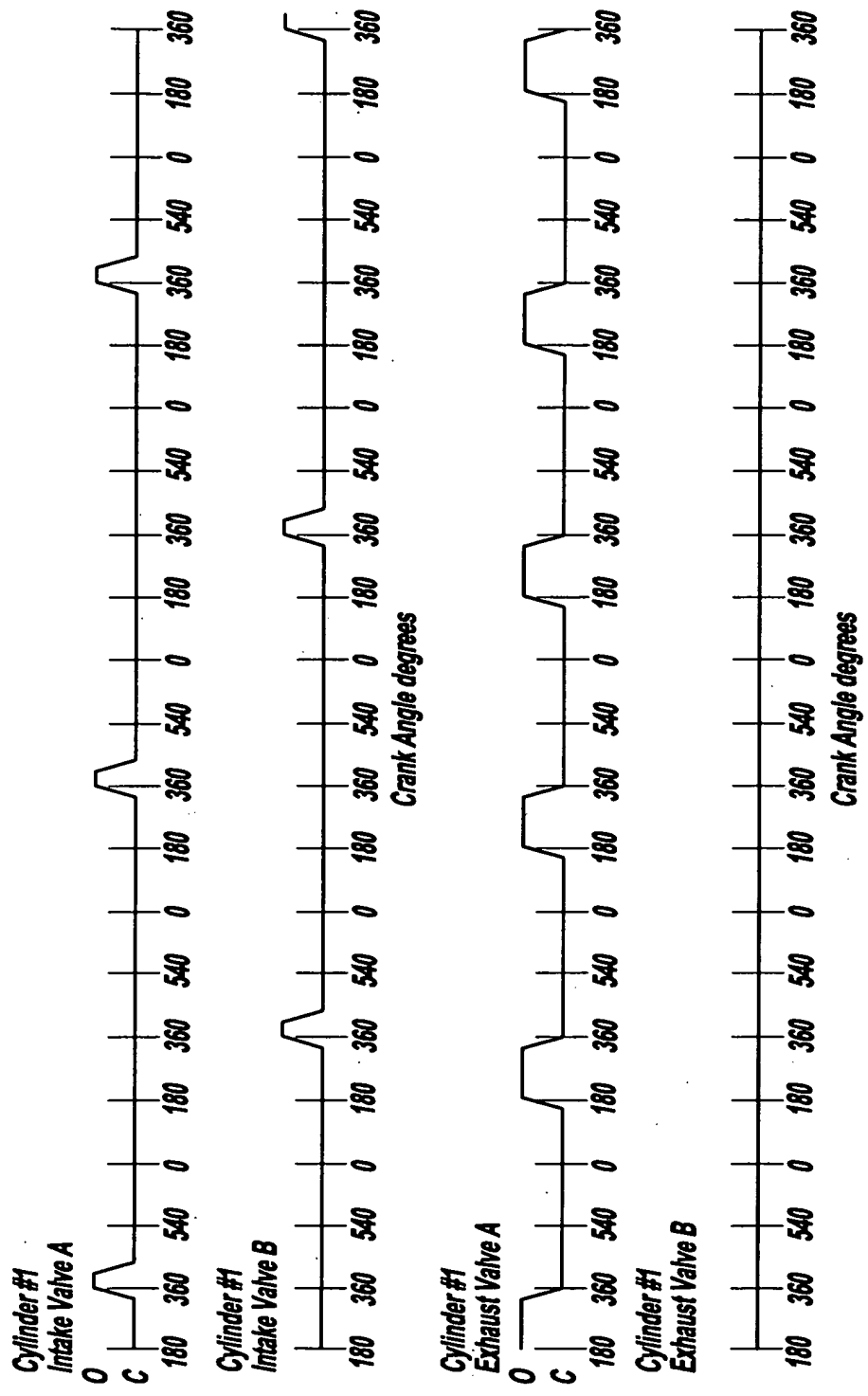


FIG - 47

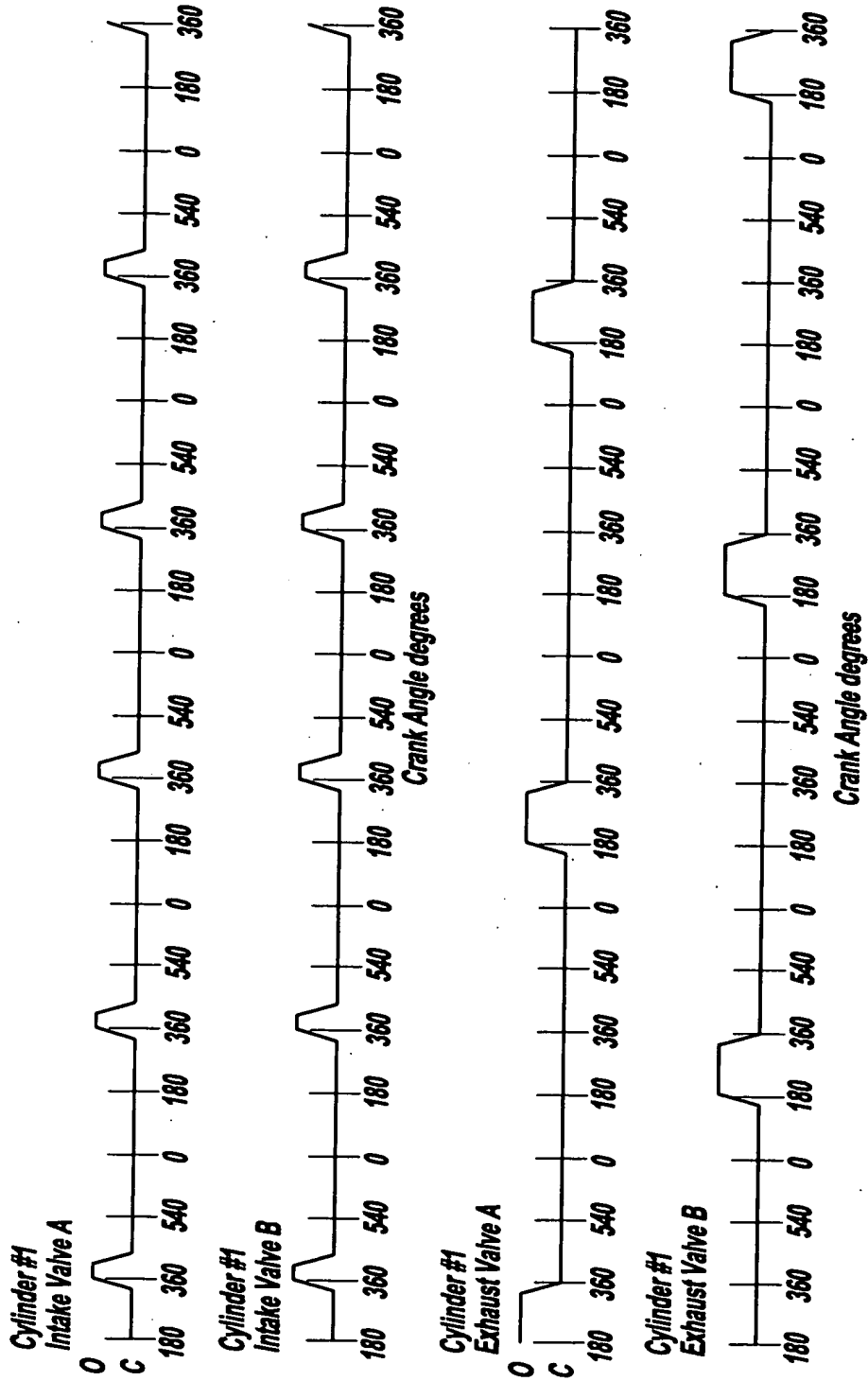
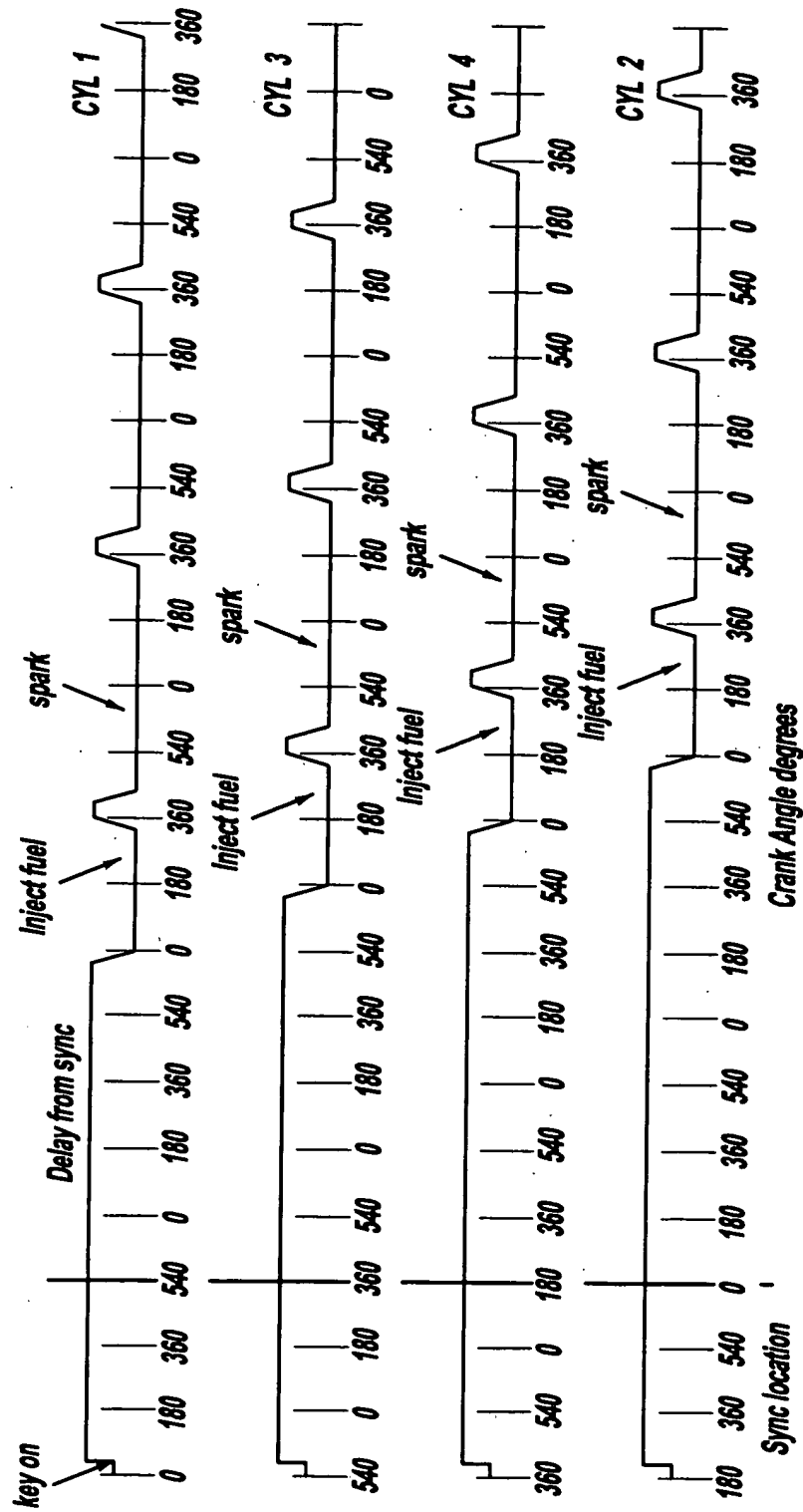
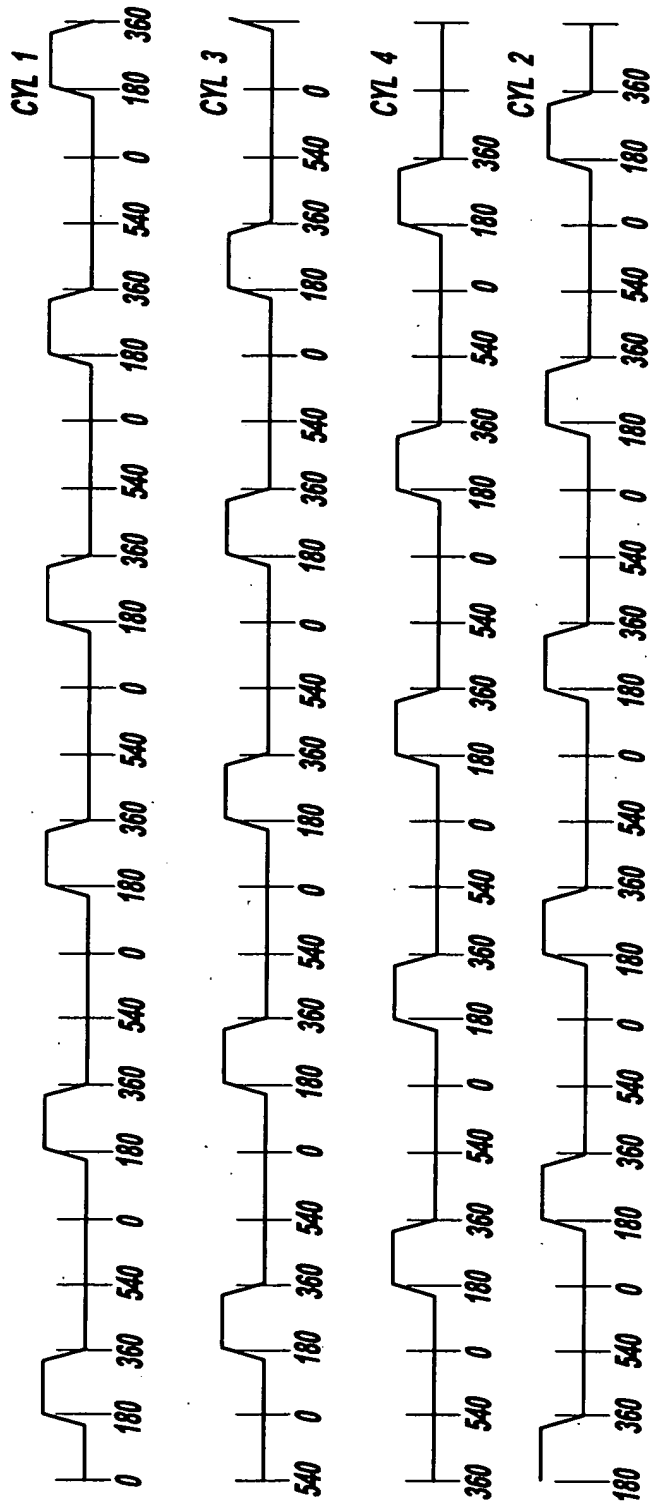


FIG - 48

**FIG - 49a**

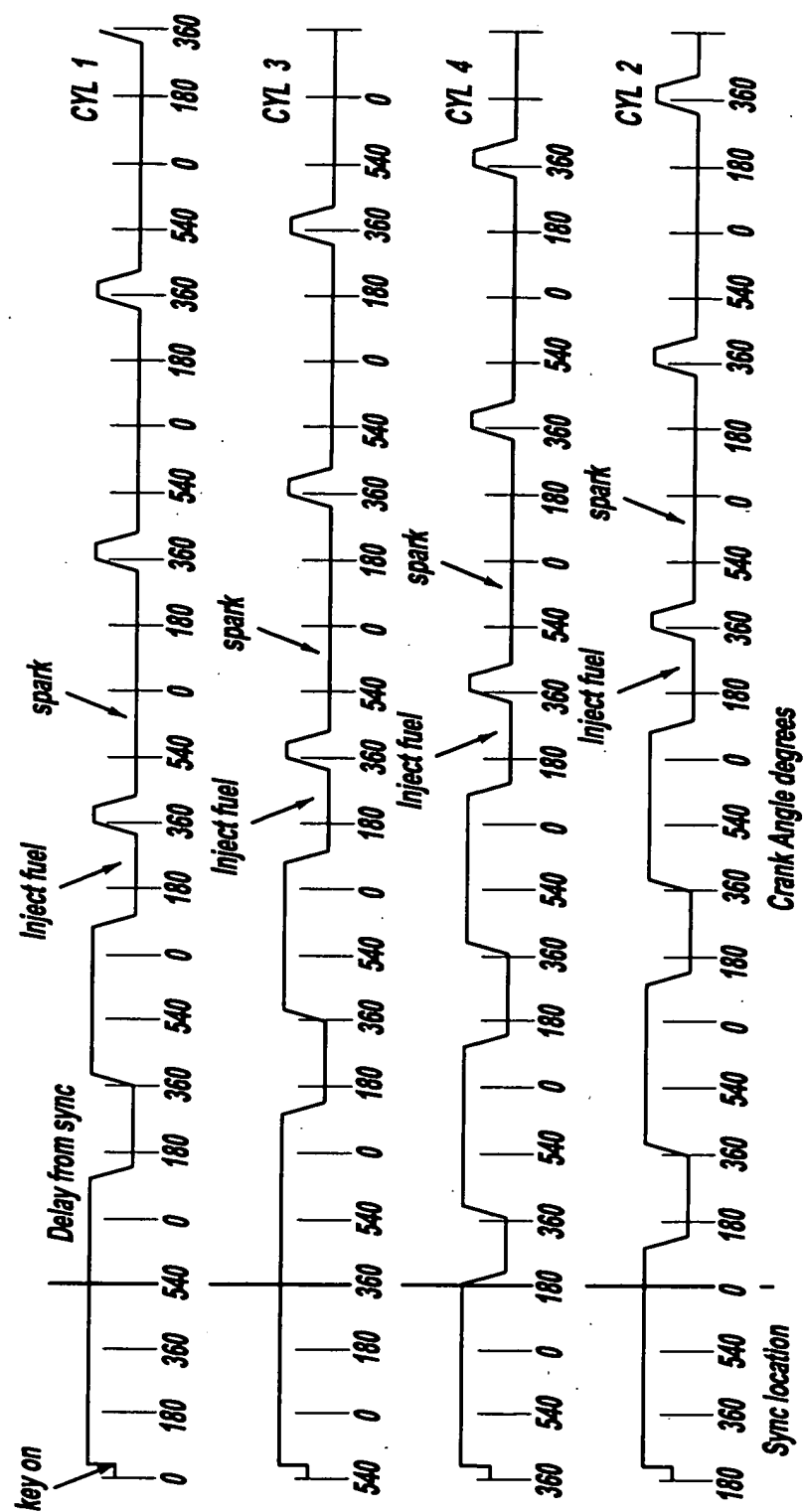


Crank Angle degrees
Exhaust Valve Timing From Start (mechanical valve operation)

Cylinder piston position cyl 1 & 4

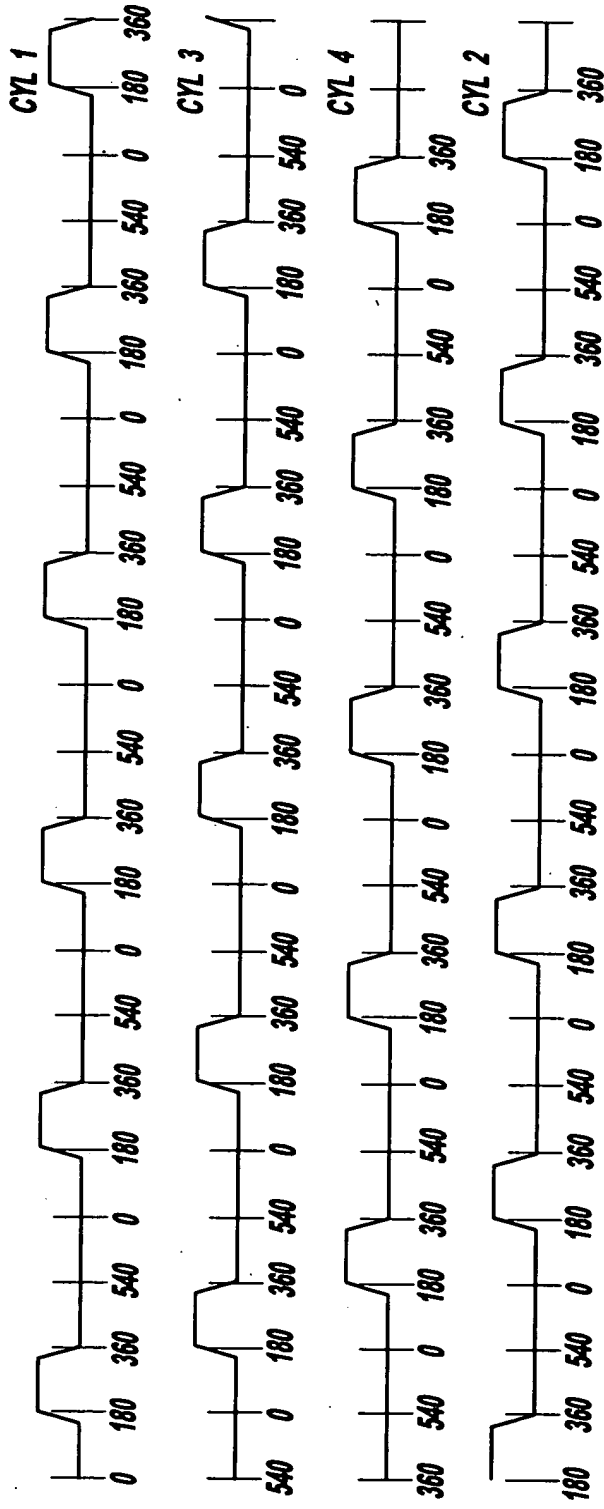
Cylinders 2 & 3

FIG - 49b



Intake Valve Timing From Start (electrical valve operation)

FIG - 50a

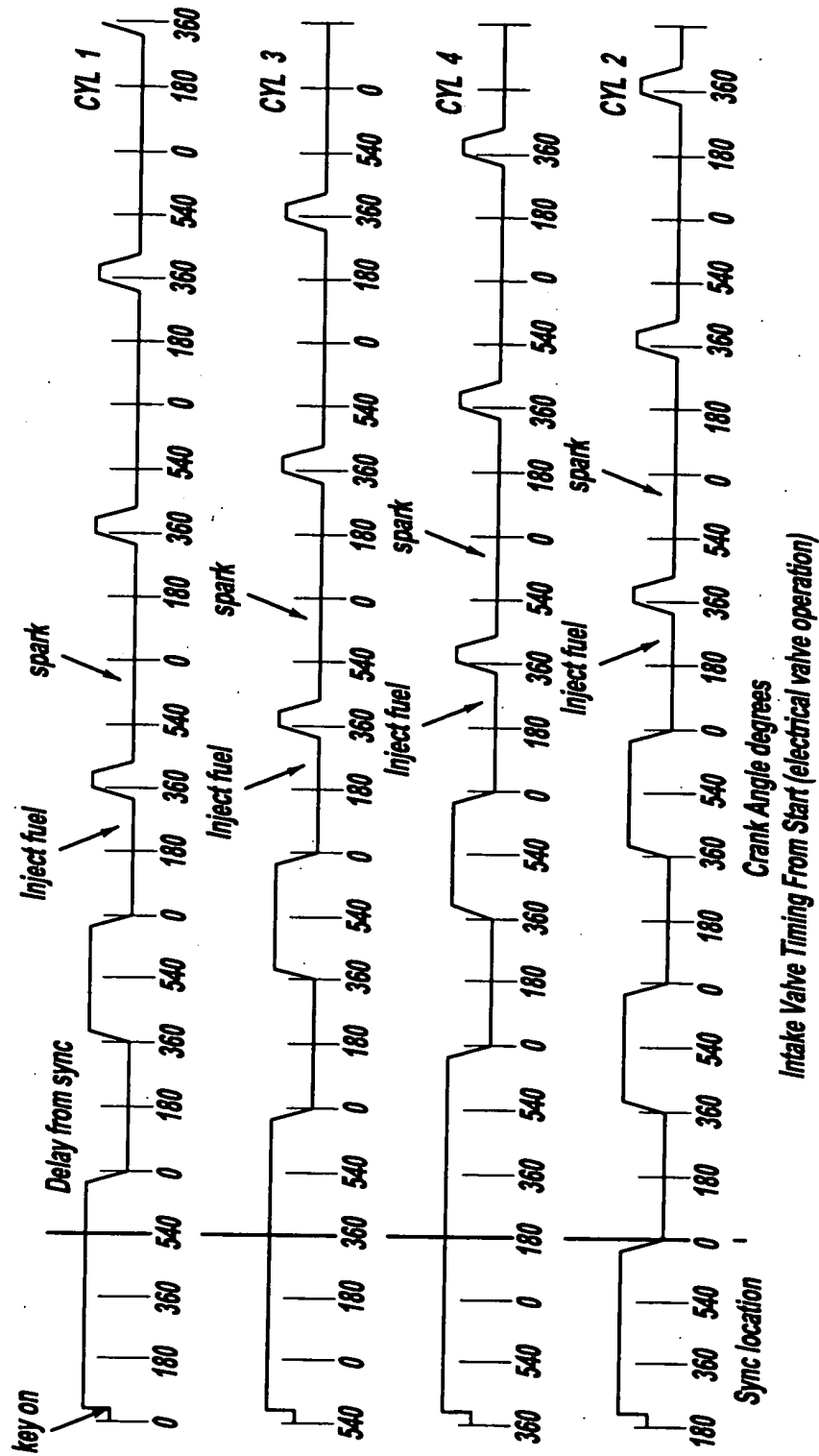


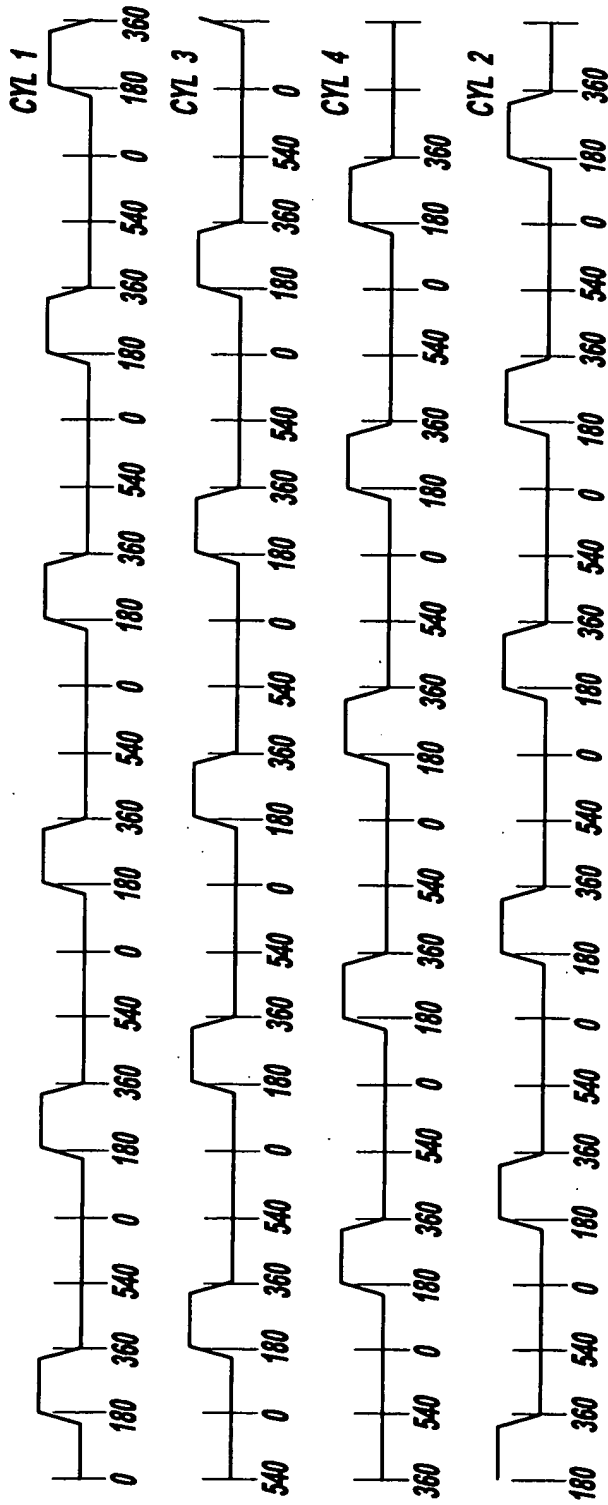
Crank Angle degrees
Exhaust Valve Timing From Start (mechanical valve operation)

Cylinder piston position cyl 1 & 4

Cylinders 2 & 3

FIG - 50b

**FIG - 51a**



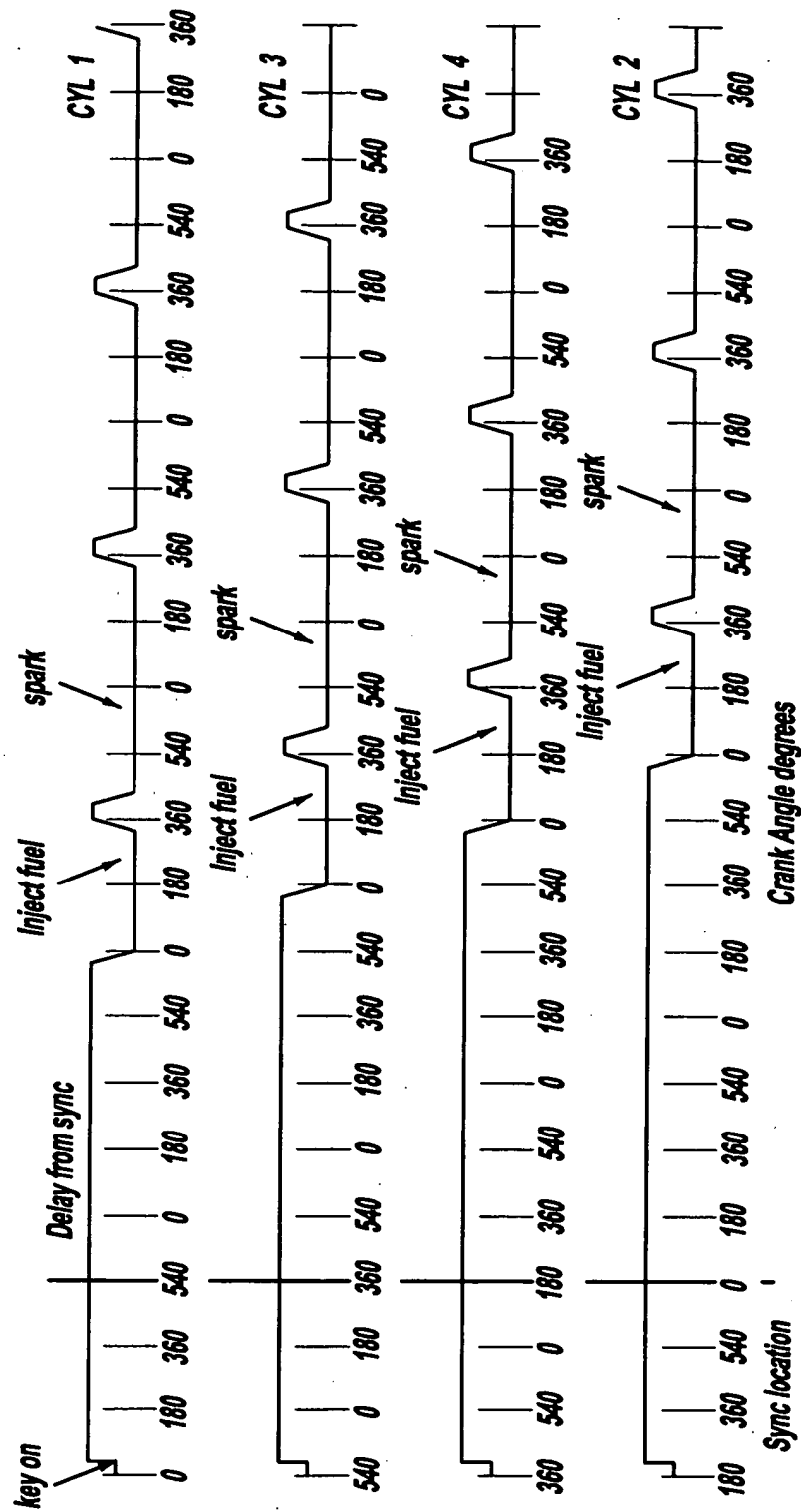
Crank Angle degrees

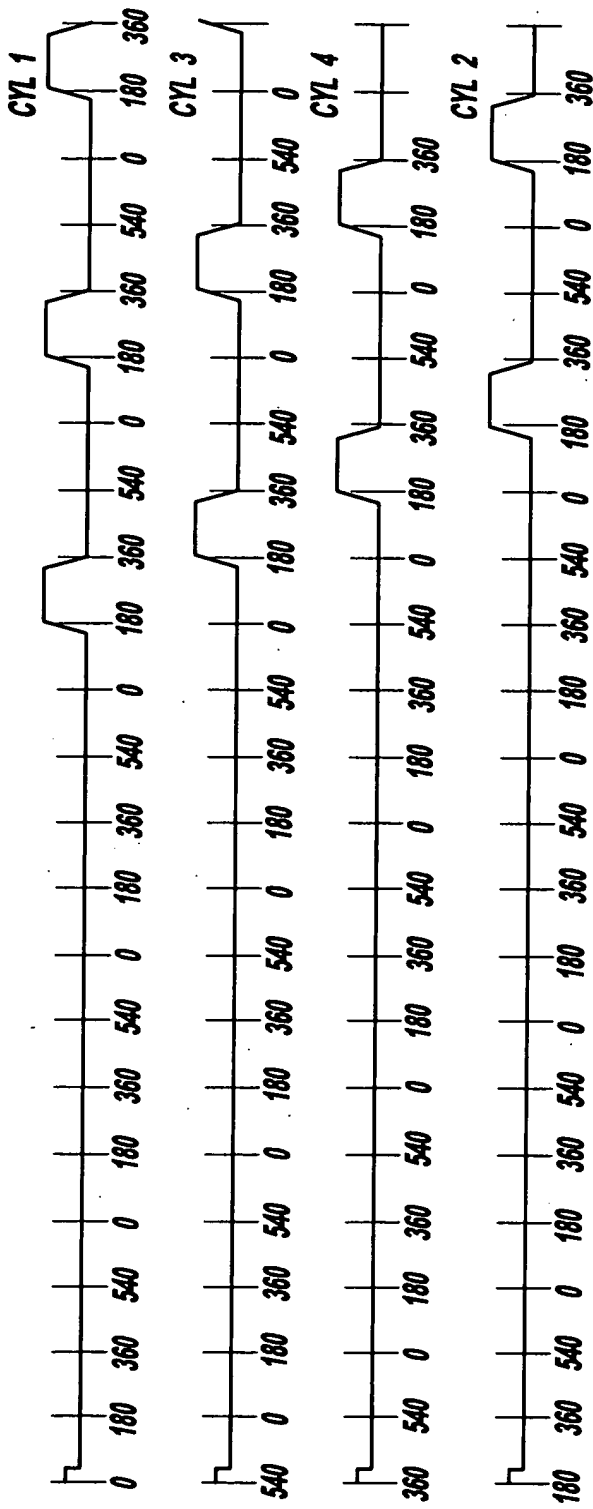
Exhaust Valve Timing From Start (mechanical valve operation)

Cylinder piston position cyl 1 & 4

Cylinders 2 & 3

FIG - 51b

**FIG - 52a**



Crank Angle degrees
Exhaust Valve Timing From Start (electrical valve operation)

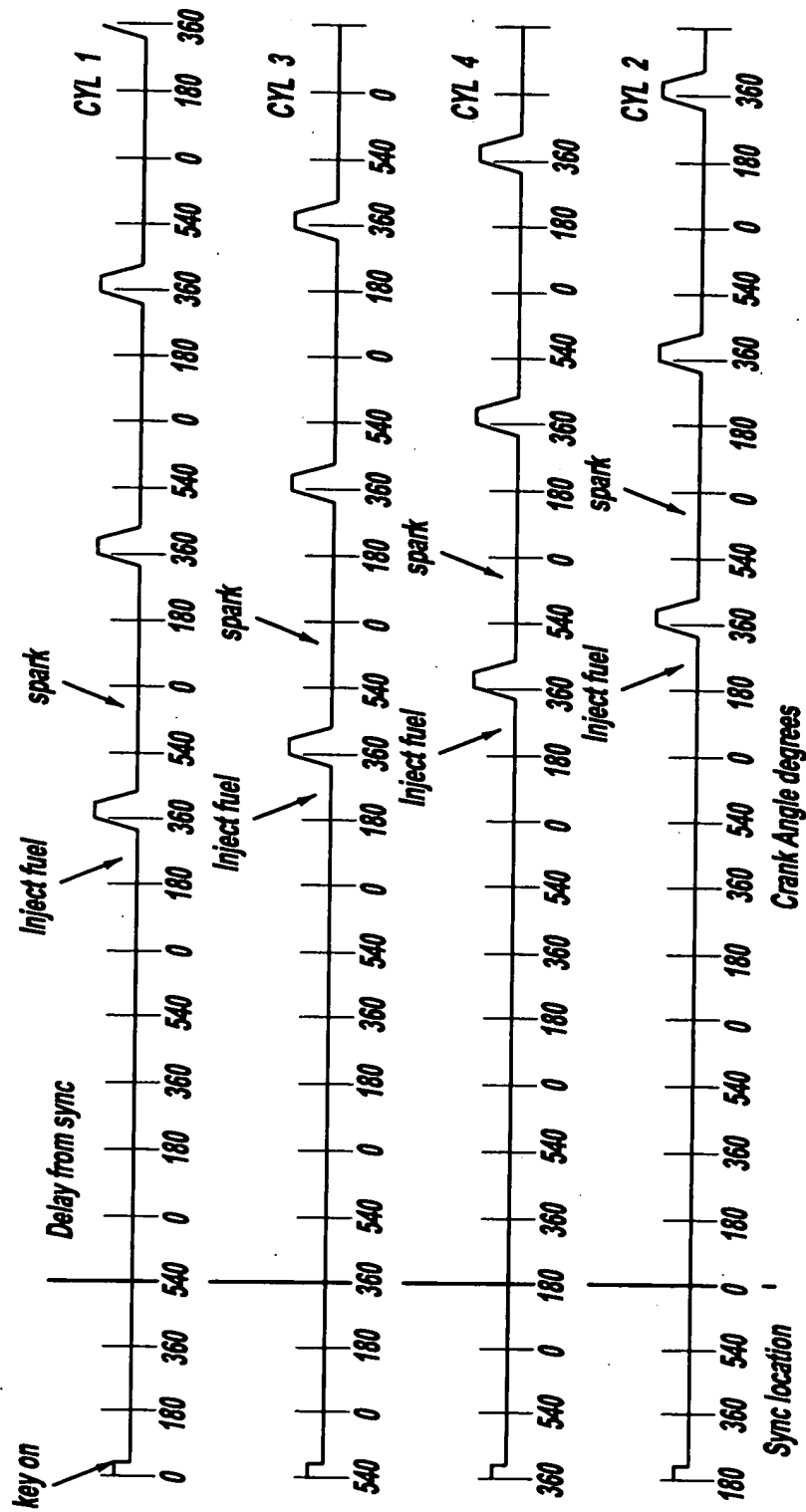
Cylinder piston position cyl 1 & 4



Cylinders 2 & 3

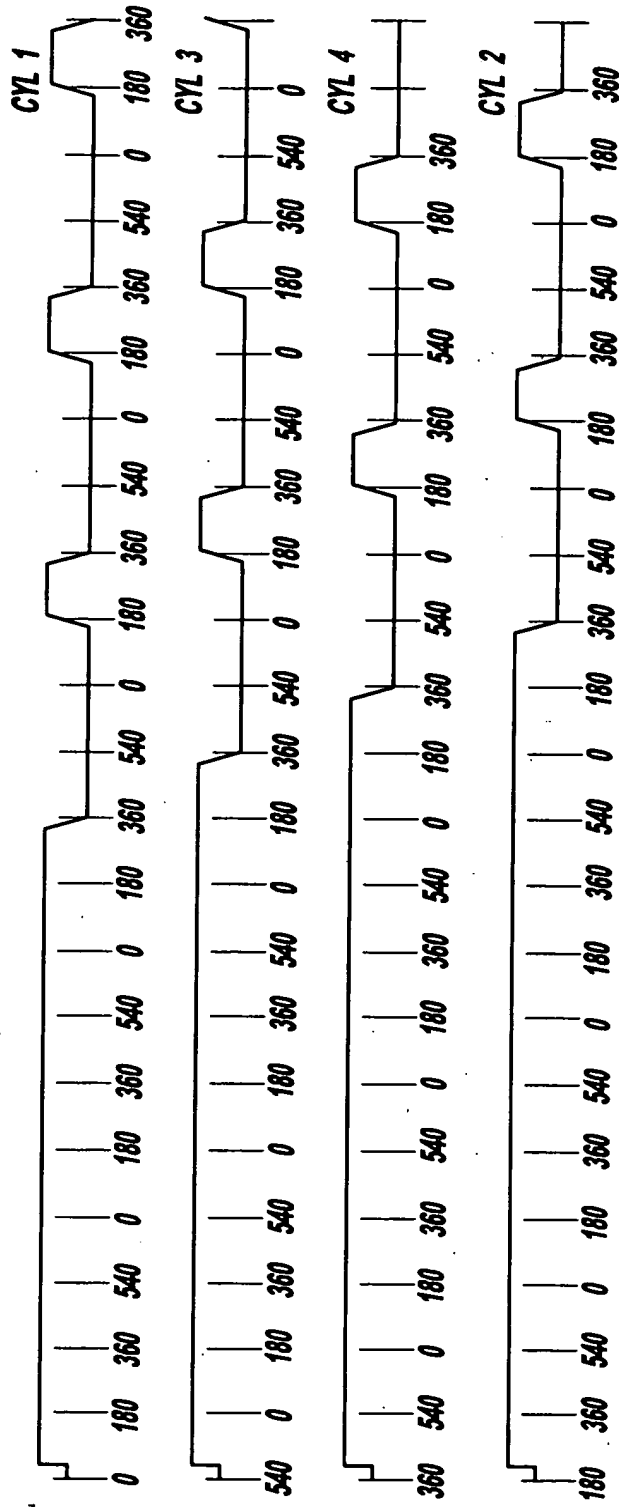


FIG - 52b



Intake Valve Timing From Start (electrical valve operation)

FIG - 53a



Crank Angle degrees
Exhaust Valve Timing From Start (electrical valve operation)

Cylinder piston position cyl 1 & 4

Cylinders 2 & 3

FIG - 53b

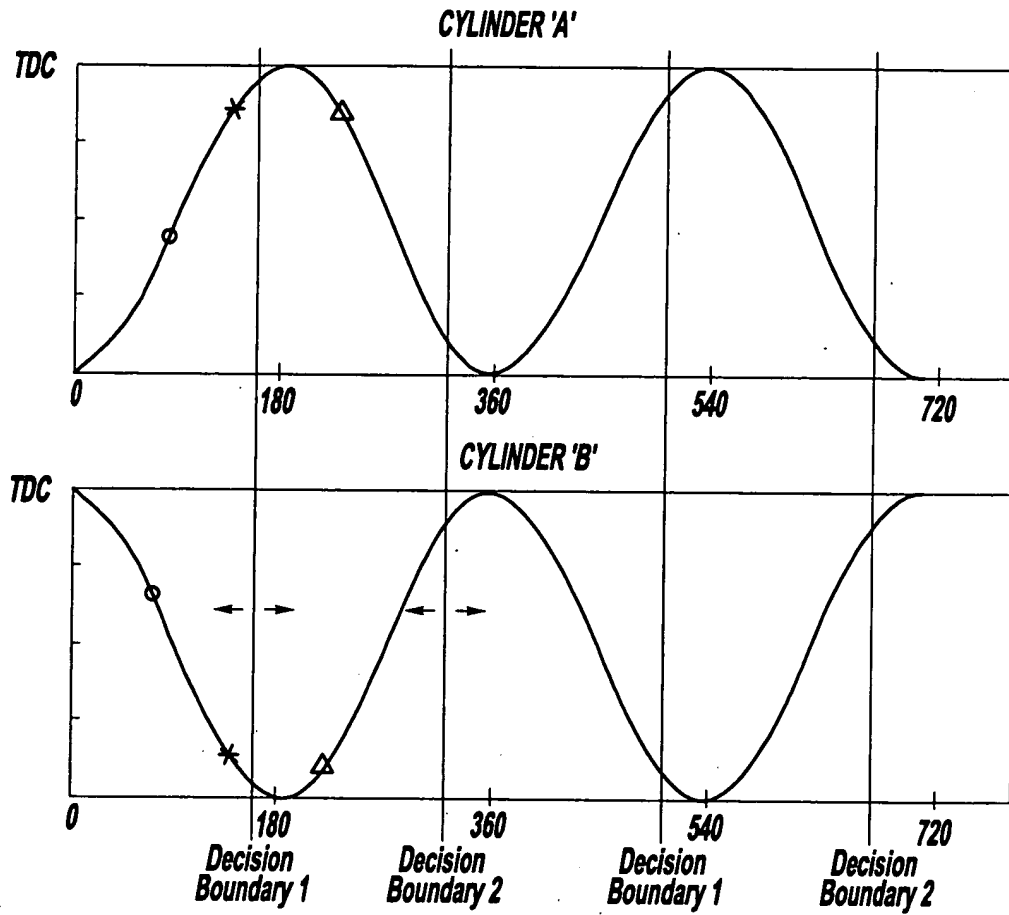
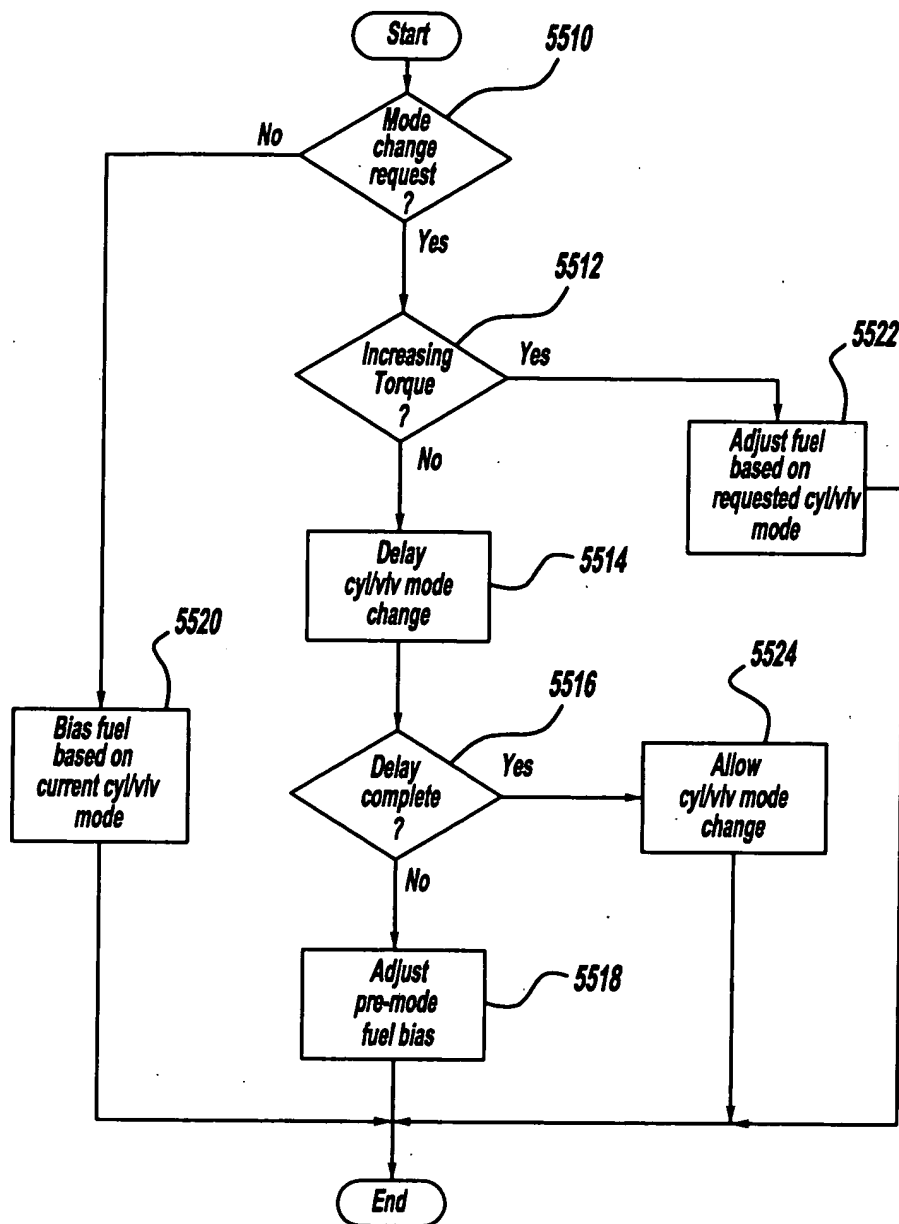


FIG - 54

**FIG - 55**